Wireless Age

Features in this Issue

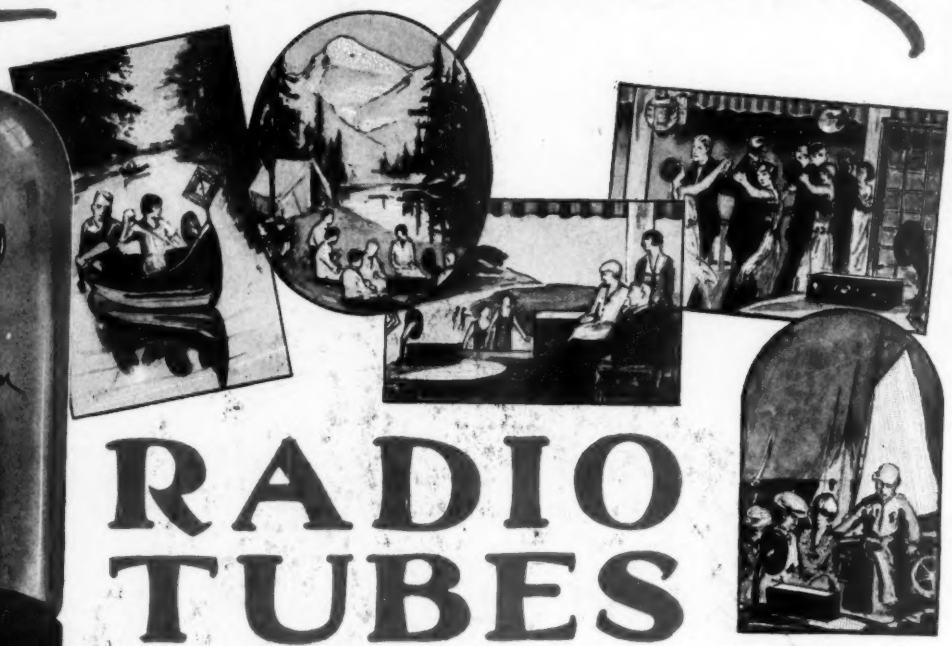
Radio in Politics

A Fiction Story You'll Remember

The D-Coil Again!

The First Record of "Radio Firsts"

Cunningham



RADIO TUBES

Bring World-Events to Far-Distant Vacation Lands

BACK-COUNTRY isolation melts into world contact as you tune-in on music, drama, and the final battles of the Presidential Campaign.

Make your camp, your cottage, your yacht the center of hospitality and entertainment.

Perfected Radio will do it, and Perfected Radio means the use of Cunningham Radio Tubes. The Cunningham dry battery detector and amplifier tube, type C-299, makes it possible for you to treble your vacation pleasure by use of a portable receiving set. The special filament in this tube, using a current so low that it may receive its supply from standard No. 6 dry batteries or even from ordinary flashlight batteries, makes possible this far-reaching application of Radio.

The receiving set you now have can be readily adjusted to use this tube and be a source of use and pleasure on your vacation trip. Your dealer can give you useful suggestions for the purchase or construction of a highly efficient portable set.

E. J. Cunningham Inc.

CUNNINGHAM TUBE PRICES

C-301A—5 Volts ¼ Ampere filament.....$4.00

C-299—3 Volts .06 amp. Dry Battery Det. and Amp. $4.00

C-300—5 Volts Gas Content Detector $4.00

C-11—1.1 Volts .25 amp. Dry Battery Det. and Amp. Special Base $4.00

C-12—Similar to C-11 with standard base $4.00

PATENT NOTICE

Cunningham tubes are covered by patents dated 2-18-08, 2-18-12, 12-30-13, 10-23-17, 10-23-17, and others issued and pending. Licensed only for amateur, experimental and entertainment use in radio communication.

Any other use will be an infringement.

DATA BOOK

Cunningham 40-page Data Book fully explaining care and operation of Radio Tubes now available by sending 10c in stamps to San Francisco office.

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182 Second Street, San Francisco

Branch
NEW YORK

Clear and distinct

Indistinct, hazy

It's a Difference of *Clearness*

HOW often, when listening in, you've tuned and tuned and still have not been able to get the music to come out clear, distinct and natural-sounding?

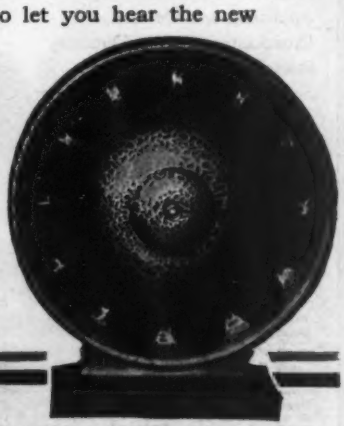
The real big difference between the N & K Imported Loudspeaker, Type W, and ordinary speakers lies in the fact that N & K reproduces *all there is to the music,* bringing out delicate high tones as well as deep low ones, clear and distinct, exactly as the musician sings or plays them. There is no exaggerated loudness, no blurring, no twanging, rasping, droning, rattling, disagreeable tone.

This is a loudspeaker of an entirely new type. The shape and finish are new and artistic, harmonizing with any style of home furnishing. The material is new. Instead of wood or metal, *burtex,* a light weight rigid substance made scientifically to eliminate counter-vibration, is used. And the speaker is so skilfully designed that it fills the entire room with its music instead of concentrating in one favored direction.

This new type of speaker bids fair to revolutionize every idea the public now has on speakers. So confident are we that it is the speaker the public has been waiting for, that we authorize dealers to allow responsible customers to try out the N & K Imported Loudspeaker with their own sets, in their own homes.

FREE OF CHARGE FOR 5 DAYS

Ask your dealer to let you hear the new N&K Imported Loudspeaker, Type W. If he is not supplied, write us. We'll tell you where you can see and hear this new invention.



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N & K Imported Loudspeaker Type W, $27.50

N & K Imported Phones Model D, 4000 ohms, $8.50

N & K Imported Phono Unit attaches instantly to any phonograph, $7.50

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Imported

LOUDSPEAKER

TYPE W

Stands 14 in. high. Wooden base, felt lined. Choice of handsome colors. Send for folder, "The Speaker You Have Waited For."

"Quality Goods for Quality Readers"

The Wireless Age

America's Foremost Radio Magazine

Vol. XII — No. 1

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Your Authors

F. R. BUCKLEY (Per Land Line) lives in Norwalk, Conn., in a Colonial farm house rebuilt and fitted with modern improvements by his own fair hands. He drives a car; smokes a pipe; stays up much too late at night; will not pay proper attention to his clothes; works hard, and wishes, simultaneously, that he didn't have to work at all, and that he could work harder. Mr. Buckley has to his credit about 150 short stories and novelettes in various magazines; principally laid in the West, with occasional forays into the Italian Middle Ages, the sea, and the sky.

ROBERT ALAN (A 60 to 600 Meter Tuner) completed an engineering course at Columbia University. While there he studied in one of Prof. Pupin's classes. At large in the world, his interest centered in radio, particularly laboratory experimental work, and the result of his experiments has been incorporated in a series of articles of which this month's is an excellent example. Mr. Alan is a dyed-in-the-wool amateur radio fan, and experimenter, talks the language, and understands the viewpoint of his clan.

SINCLAIR ARTHUR (The Vansittart Case) will be remembered for his Canadian stories. He acted as a newspaper correspondent for several years, then as radio editor of a large New York daily, and now roams about looking for good story material. He has just returned from the South with a series of stories which he declares "will make doggone good reading."

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James G. Harbord, Pres. Pierre Boucheron, Vice-Pres. and Gen'l Mgr. L. MacConnach, Sec'y. George S. DeSousa, Treas. H. L. Welker, Adv. Mgr. H. H. Reber, Bus. Mgr.
C. S. Anderson, Managing Editor R. A. Bradley, Technical Editor W. A. Hurd, Associate Editor

Because certain statements and expressions of opinion from correspondents and others appearing in these columns from time to time may be found to be the subject of controversy in scientific circles and in the courts, either now or in the future and to sometimes involve questions of priority of invention and the comparative merits of apparatus employed in wireless signaling, the owners and publishers of this magazine positively and emphatically disclaim any privity or responsibility for any statements of opinion or partisan expression if such should at any time appear herein.

Printed in U. S. A.

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"Experience is the Vital Factor in Excellence"

The Thompson reputation is a reputation gained from making radio products *exclusively* for over 14 years. It is a reputation which is meaning more and more to those who want to get the best that experience can build.

THOMPSON
Neutrodyne Radio

Thompson power and selectivity, Thompson ease of operation, and Thompson freedom from trouble, are features that should be investigated before an investment in radio entertainment is made.

The Thompson 5-tube, factory-built Neutrodyne Radio is made up of parts that are known to be the standard in their group. Yet, the manner in which these parts are built into the finished instrument is the chief reason why the Thompson Neutrodyne Radio is a revelation to both layman and expert.

If your dealer does not handle Thompson radio products, write to us for descriptive literature and the name of a Thompson dealer near you.

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NEUTRODYNE

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Haynes-Griffin

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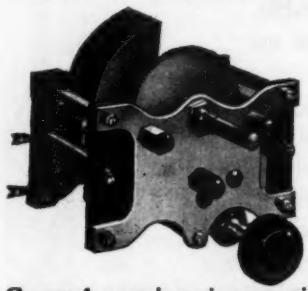
LOW LOSS GROUNDED ROTOR CONDENSER

(With Geared Vernier)

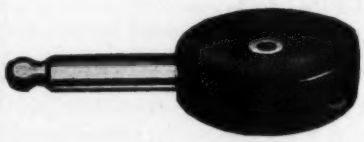


This variable condenser has been designed and manufactured with the sole object of producing the most efficient instrument of its kind.

That we have achieved our aim is proved by the fact that the equivalent series resistance of this condenser at 1,000 cycles full capacity setting is 20.5 ohms. Condensers with solid dielectric end plates average about 450 ohms under the same test.

Geared vernier gives positive hairbreadth adjustment without the use of a special vernier dial. Rotor plates are grounded to the frame. Maximum capacity is .0005 mfd., minimum 9 mmfds. Price, with 3-inch Bakelite dial and vernier knob, $8.00.

THE AUTOMATIC GRIP FOR CORD OR TIP



Haynes-Griffin Phone Plug

The new Haynes-Griffin Phone Plug is the most convenient on the market. It will grip firmly any size of phone cord tips or any size wire down to No. 20.

Simply push the phone leads into the plug. When desired, pull them out. The plug has no screws or buttons to bother with, and it does not have to be taken apart. Price 75c.

FOR SHARPER TUNING IN YOUR "SUPER"

Variable In-Put Condenser

For use across the primary of the In-Put Transformer in Super-Heterodyne receivers, we recommend this new Variable In-Put Condenser, also known as the Amplex Grid-Denser, Type H-G.

It is the only small mica variable condenser with the special high capacity range of .0003 to .0008 mfd. Its use in your "Super" will make possible the utmost selectivity and the finest tone quality. Price $1.75.

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RADIO SERVICE, Inc.

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The Super-Heterodyne Made Easy

A. J. Haynes, Assoc. Inst. Radio Engineers, author of "Super Success" and designer of special parts for the Super Heterodyne.

In the January, 1924, issue, *Radio Broadcast* gave to the radio public complete instructions for building and operating the Haynes Simplified Super-Heterodyne.

A. J. Haynes had experimented with the "Super" for a year prior to this announcement. He and his laboratory assistants had worked for twelve months with but one end in view—to bring the world's most efficient radio receiver to the average fan as a practical set for him to build and operate. How well Mr. Haynes accomplished his object is proved by the results fans all over the world have had with the circuit.

Radio Broadcast for March, 1924, says: "We can promise the radio enthusiast that, if this set is properly constructed and adjusted, it will be some time before he will wish to seek further for the ultimate receiving set; for quality of tone, selectivity, and distance the "Super" reigns supreme."

The Haynes Simplified Super-Heterodyne is a tried and proven circuit. It operates equally well with dry cell and storage battery tubes, and it can be built by the average fan.

"SUPER SUCCESS" *by A. J. Haynes*

This new booklet has torn the veil of mystery from the "Rolls Royce of Radio Receivers." It presents the "Super" to the average layman not as something to be afraid of, but as the best set for him to build.

It is the complete story of the Super Heterodyne from a non-technical discussion of the theory of the circuit to detailed instructions for building and operating the set.

It contains the gist of every article on the Super-Heterodyne which has appeared over Mr. Haynes's signature, besides a great deal of heretofore unpublished information which Mr. Haynes has gathered during his constant experimentation with the "Super".

No matter whether you are thinking of building a "Super" or not—or whether you have already decided on a certain make of parts which you will use—you owe it to yourself to read "Super Success".

It will give you a new insight into the Super-Heterodyne and enable you to go ahead with every step of construction with adequate knowledge.

"Super Success" is written from an entirely unbiased standpoint. It does not set out to sell any specified brand of parts. Rather, it discusses all types of apparatus and shows the advantages and drawbacks of each. It recommends certain instruments only after their superiority has been demonstrated.

It tells you how to obtain the utmost selectivity, the necessity for matched transformers, how to match your own transformers, how to make use of an English custom, how to receive the low wavelength broadcasts from WGY and KDKA.

It is written by a competent, experienced engineer, a man whom Radio Broadcast says "is considered an authority on the Super-Heterodyne."

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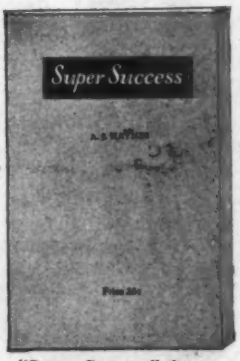

"Super Success" the most authoritative book on the Super-Heterodyne. Price 25 cents.

Maj. J. Andrew White is in charge of our Mail Order Department

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A—Weather-proof cloth covering
B—Braided copper tinsel radio-frequency shield
C—Headset conductors (+ and -)
Patented 8-12-24 (other patents pending)

3 exclusive features of the Navy Type Headset

TWO extra technical developments and one extra testing operation! These add clarity and distance. These are the three exclusive features which make the Brandes Navy Type the ideal long distance headset.

1. —The development of the braided copper tinsel radio-frequency shield (shown at the left) which surrounds the conductor cords and grounds all radio-frequency currents that might cause detoning effects in the receivers. And in addition, it eliminates cord capacity.

2. —The use of inside terminals, so designed that the cords may be removed or replaced without taking off the cap of the receiver or in any way disturbing the perfectly matched tone.

3. —A very delicate testing operation matches the tone of the two receivers so that both ears hear exactly the same sound at the same instant.

And to assure absolute perfection of every detail, every Navy Type Headset must pass 22 different tests and inspections.

Brandes

Superior *Matched Tone* Headset $6
$7 in Canada

Table-Talker $10.
50¢ extra west of the Rockies
In Canada $14

Navy Type *Matched Tone* Headset $8
$11 in Canada

The name to know in Radio

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GAROD

ANNOUNCES THEIR NEW POWERFUL NEUTRODYNE MODELS THE GEORGIAN AND THE V

The public wants Power

The Garod Georgian

Rich brown burled walnut, with door-panel borders of inlaid ebony and holly —5 tube model—built-in loud speaker—battery compartments and accessory drawer. Will grace the finest drawing room—provide the best in radio reception. Size 35½" long—16⅝" deep—42½" high.

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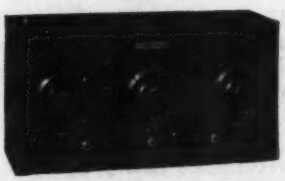
$195.00

The Garod RAF

The receiver that made GAROD famous. Added mechanical improvements — 4 tube model — with which you are familiar. Size 19½" long—7⅛" deep—10" high.

$135.00



Power—to produce great volume.

Power—to bring in distant stations.

Power—to work through local stations.

Power—to moderate or intensify volume.

Power—to render the original quality of tone transmitted.

Power—to select programs.

Power—to get the best out of the program.

These models have power plus—and then more power. They are full voiced—with tonal quality of exquisite timbre. They can be controlled to meet the capacity of the small living room, or manipulated to take full advantage of the acoustic possibilities of the large hall.

In every respect, they are worthy of bearing the name GAROD.

We are now ready to enter orders, and grant jobbers of standing, exclusive non-conflicting territories, where open.

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Madison Square Garden, New York
September 22 to 28, 1924

Third Annual Chicago Radio Show
Coliseum, Chicago, Ill.
November 18 to 23, 1924

The GAROD Corp.
120 Pacific Street, Newark, N. J.

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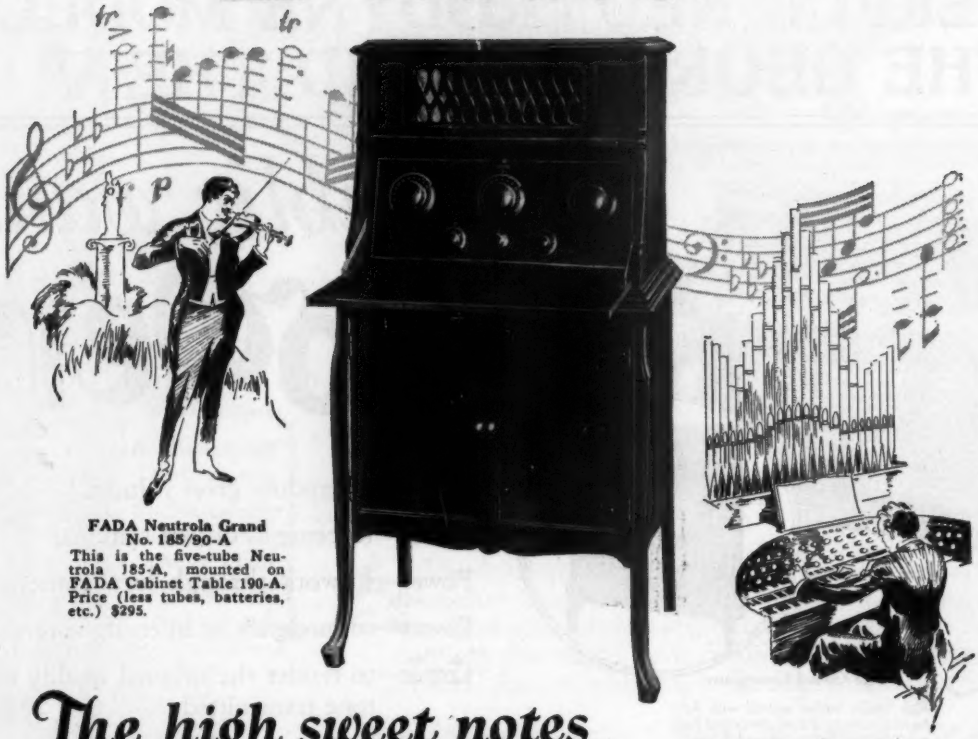
FADA Radio

FADA Neutrola Grand
No. 185/90-A
This is the five-tube Neutrola 185-A, mounted on FADA Cabinet Table 190-A. Price (less tubes, batteries, etc.) $295.

The high sweet notes of the violin—the low rolling bass of the organ

TONE quality—true reproduction of voice and music without distortion—is one of the outstanding features of the new FADA Neutrodynes. You hear the music just as it is played or sung.

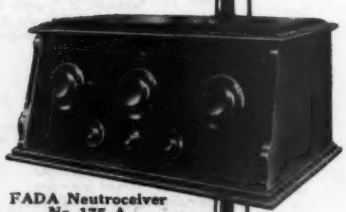
FADA Neutrodynes can be depended upon at any time, anywhere, to give you the utmost in radio. They operate on a simple indoor or outdoor aerial and use the types of powerful tubes which give maximum results. Each bears the stamp of FADA engineering skill plus the artistry of master cabinet designers.

You who have deferred buying a radio set—waiting for someone to produce just your combination of price, performance, cabinet design and finish—need wait no longer. In the new complete line of FADA Neutrodyne receivers you can find exactly what you want.

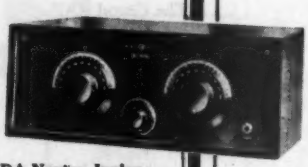
See your dealer. He will show you a FADA Neutrodyne that will delight you—in appearance, performance and price.

You have a range from $75 to $295 from which to select—six models, each a remarkable value.

F. A. D. ANDREA, INC., 1581 JEROME AVE., NEW YORK



FADA Neutroceiver
No. 175-A
Mahogany cabinet. Inclined panel and roomy battery shelf. Five tubes. Price (less tubes, batteries, etc.) $160.



FADA Neutro Junior
No. 195
Three-tube Neutrodyne. A wonderful performer. Price (less tubes, batteries, etc.) $75.

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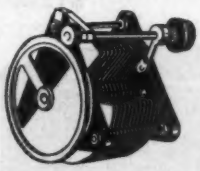
Quality—

Easily Recognized

Vario Couplers
Ammeters
Sockets
Wavemeters
Condensers



When you buy *General Radio* apparatus you are buying *certainties.* You can definitely depend upon its *superior performance* in broadcast reception.

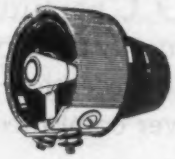
By insisting upon *General Radio* apparatus at the start you avoid the disappointments which so often follow the purchase of inferior parts.

Look for the red cartons with the *General Radio* label.

Ask your dealer or write us for our New Radio Catalog

Sold by Good Radio Dealers Everywhere

Transformers
Potentiometers
Insulators
Dials, Switches
Rheostats



GENERAL RADIO Co
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Dealers and Jobbers write for Information

"Quality Goods for Quality Readers"

MAGNAVOX Radio
BROADCAST RECEIVER

The new Magnavox TRF-5 Receiver is here shown with Magnavox M4 Reproducer, ($25.00) which insures clearest tone.

The long awaited Broadcast Receiver

Combining supreme efficiency, convenience and beauty, produced at a low cost which brings it within reach of all.

HERE at last is the perfected instrument permitting you to enjoy *simultaneously* the most desirable elements of broadcast reception—features which no one model ever combined before.

The distinctive Magnavox tuned radio frequency circuit is characterized by exceptional clearness and volume as well as selectivity. The Magnavox Unit Tuner does away with all complicated dialing and places the novice on the same footing as the radio expert.

Magnavox Broadcast Receivers and other Magnavox Radio Products are sold by reliable dealers everywhere. Write for new illustrated catalog.

THE MAGNAVOX CO., Oakland, Calif.
New York: 350 West 31st Street *San Francisco:* 274 Brannan Street
Canadian Distributors: Perkins Electric Limited, Toronto, Montreal, Winnipeg

10R

TRF-5

A 5-tube tuned radio frequency receiver consisting of two stages of tuned radio frequency of special design, detector and two stages of audio frequency.

Cabinet measures: height, 9⅝ in.; length, 20½ in.; depth, 14¾ in.

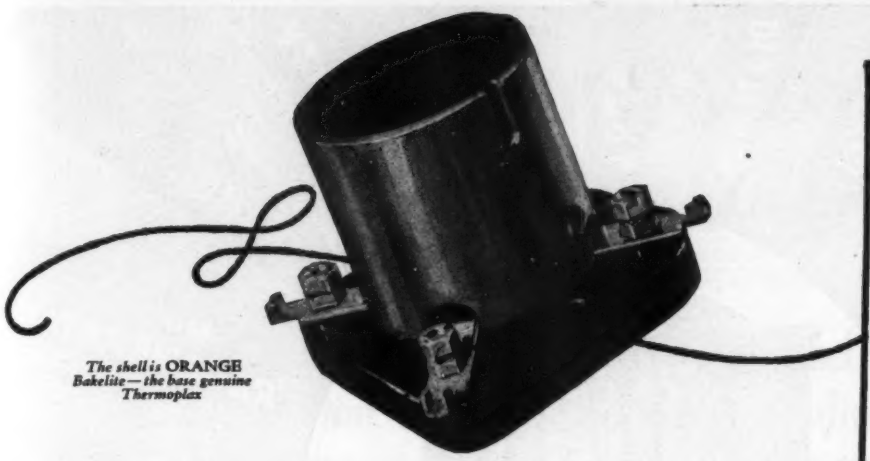
Without tubes, batteries or reproducer $125.00

TRF-50

This model is identical with TRF-5 but encased in larger carved cabinet with built-in Magnavox Reproducer.

Handsomely carved cabinet measures: height, 14¾ in.; length, 20½ in.; depth, 18¾ in.

Without tubes or batteries $150.00



The shell is ORANGE *Bakelite—the base genuine Thermoplax*

At Last—A Radio Socket Worthy of This Famous Trade Mark

After months of experiment and research the Cutler-Hammer engineers announce this masterpiece of radio socket design. With features never before found in any socket, it brings to your set a degree of efficiency that means added miles of range and hours of clearer, more enjoyable reception.

Capacity has been absolutely minimized—without sacrifice of mechanical strength, and its base of ebony black Thermoplax in beautiful color contrast with the thin shell of orange Bakelite adds as much to the appearance of any set as this socket's construction does to its efficiency.

You'll like all of its many exclusive features—the silvered bronze contacts that afford *permanently* perfect contact; the slotted binding nuts; the handy terminals for soldering; the wide spacing of current carrying parts.

You'll like its appearance—neatness—small size. You'll like the way the tube is inserted and removed without twisting. And best of all, you'll like the price, 90c. *This socket that meets the specifications of the most exacting radio engineer costs no more than most of those on the market today.* Until all dealers have been stocked, you can be supplied direct from the factory at the retail price plus 10 cents for packing and postage. Be sure you have the genuine—it will pay you in every way to refuse all substitutes.

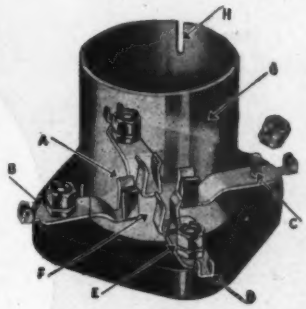
THE CUTLER-HAMMER MFG. CO.

Member Radio Section, Associated Manufacturers of Electrical Supplies

MILWAUKEE, WISCONSIN

C-H

These Exclusive Features Assure Better Reception



A

Perfect contact. Both sides of tube prong cleaned when inserted—no contact or wear on soldered end.

B

All metal parts *silver* plated—perfect contact for the life of the set. Silver may tarnish but its contact resistance does not change.

C

One piece contact construction. The binding post is NOT a part of the circuit—the wire to the socket always touches the contact strip which carries the current direct to the tube prong—no joints to cause losses.

D

Convenient terminals for soldering—full length to allow bending down for under-wiring. Ears hold wire in place for soldering.

E

Extra handy binding posts—tight connections with either wrench or screw-driver. Lock washers hold terminals rigid.

F

Wide spacing of current carrying parts both in air and insulation—true low-loss construction.

G

A minimum of both metal and insulation for low capacity. Shell of thin Bakelite—the base of genuine Thermoplax.

H

The tube is held in place by merely a vertical motion—no twisting to separate bulb from base.

The attractive orange shell helps identify this better socket, but the famous C-H *trade mark both on the socket and on the orange and blue box is your genuine protection*

C-H **RADIO SOCKET**

"Quality Goods for Quality Readers"

Bestone
V-60

"The Aristocrat of Radio"

AS ILLUSTRATED WITH BUILT-IN LOUD SPEAKER AND BATTERY COMPARTMENTS
$165

RECEIVER WITHOUT LOUD SPEAKER AND IN OTHER CABINET
$115

PERFECT TONE
VOLUME—DISTANCE
SIMPLICITY OF OPERATION

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NON-REGENERATIVE
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"Quality Goods for Quality Readers"

DAVEN RADIO

The Sine of Merit

The "Sine" of Merit—and What it Means to Good Radio!

There are few radio receivers where efficiency can not be increased by the use of one or more DAVEN RADIO ESSENTIALS.

Neat and positive clip mountings permit instant and solderless changes of resistors and by-pass and grid condensers, for the experimentation that is truly essential to the efficient operation of individual receivers. Seventy-five percent. of all receivers will respond with greater signal strength, selectivity and distance to slight changes in the usual values of capacity and resistance.

And the output of the overall efficient receiver is delivered to a Resistance Coupled Amplifier that preserves, with a more fundamental efficiency, the tonal beauty of the original voice or music. No other amplifier can equal it. And the DAVEN is the peer, as well as the pioneer of RESISTANCE COUPLED AMPLIFIERS.

Think of Daven When You Design Your Next Set!

To those who delight in building their own set, the DAVEN KITS will settle their difficulties. In this way—and this way only are they assured of obtaining the right parts—all LABORATORY TESTED.

TYPE 3-K—Three-step Resistance Coupled Amplifier Kit without sockets and condensers.....$8.50

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Read "RESISTORS, THEIR PRACTICAL APPLICATIONS IN RADIO RECEPTION." By Zeh Bouck. Price 15 cents.

Also read "THE HOW and WHY OF RESISTANCE-COUPLED AMPLIFICATION." Price 10 cents.

These booklets are full of interest and may be obtained from your dealer

THE DAVEN RADIO CORP.

"Resistor Specialists"

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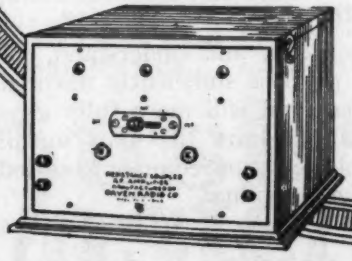
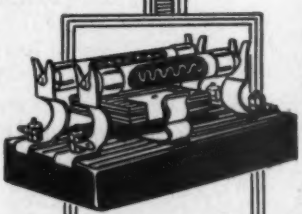
Dealers:

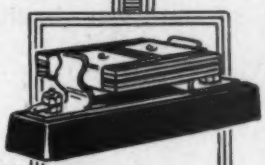
Ask your jobber to send you proposition on the Daven Products



De Luxe Amplifier

Type 3-C Kit





Editorial Chat

A RENOWNED editor once said: "If I found an individual who liked everything in any one of my publications I would know there was something wrong with it." This is particularly true on the eve of a presidential election. October is a critical period—the moment just prior to another four-year swing of the political pendulum. The editorial on page 17 contains five major points significant to radio-fan-voters, this being the sixth, or vital point.

The Dawn of Radio in Politics

Members of the Cabinet have something to say about the non-partisan, but very important role of radio in American politics. Members of the Senate, and the House have more to say. All of it to the point. And all of it said for you—to you—in these pages. Then along comes Mrs. Christine Frederick with a study in contrasts that is informative, and yet is entertaining. A feminine bit of surreptitious masculinism.

"Per Land Line"

Gold Creek is suggestive of the quaint and picturesque. Enter, the town marshal, and you have the picture complete. Then a chance radio salesman who tells the marshal to throw his aerial across a telephone line, and you have a promising situation. All you now need is the ability to laugh. F. R. Buckley does the rest.

Technical

The D-Coil Again! Day after day, letters pour into our office commending—some critical—others suggesting, but all enthusiastic about this astatic receiver. The sheer volume of correspondence is sufficient evidence of the demand for the D-Coil again. The requests for the D-Coil again, establish a record. Here is a standard that we shall maintain. And the 60-600 Meter Tuner will probably surprise you, even though you are a dyed-in-wool fan.

Variety

World wide news, assorted, condensed, and offered in a single article, will give you the high lights in the world's progress the past few weeks. Then there is the *radio* story of the world flight—the important role of radio in the airline circumnavigation of the globe. Also the story of Marconi's early experiments, that is now of interest because we have at our control—the twirl of a dial—the best of entertainment and culture, the participation in governmental affairs and the active association with world events at large.

And Then—

After you have read this issue of your magazine, and understand, in good measure, the objective of its contents—a serious purpose sufficiently flavored with the humorous to relieve it of the dogmatic stigma—you will more fully grasp the tremendous power and breadth in radio, and come to know that only in this universal service can mankind acquire his equitable lot of knowledge, or knowledge be equitably distributed for the enlightenment of the individual.

—THE EDITORS.

Make the World of Music Yours

WHEN a famous soprano sings the Gypsy Song from Carmen, hear it in your home exactly as she sings it.

Through Music Master, the musical instrument of radio, let her voice be crystal clear. Music Master gives to radio life and beauty, lending a wholly new charm to the wonders of the air.

Music Master is not just a loud speaker —it is a **true** speaker, a **clear** speaker, a pleasing musical instrument.

Radio impulses entering the sensitive precision instrument in the base are translated into sound waves, undistorted and faithful to the original voice or instrument. In the tapered tone chamber of cast aluminum these sound waves grow clear and bell-like and, finally, the full, mature tones pour forth in rich resonance through the Music Master amplifying bell of natural wood.

Your dealer knows. Have him send you a Music Master to be proved with your own set.

Dealers Everywhere

Music Master Corporation

Makers and Distributors of High-Grade Radio Apparatus

10th and Cherry Streets

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Music Master
RADIO REPRODUCER

Connect Music Master in place of headphones.

No batteries required. No adjustments.

14-inch Model, for the Home $30

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"Quality Goods for Quality Readers"

Ware NEUTRODYNE Receivers

The dominating idea of the Ware Radio Corporation is to build the best receivers that can be made. Tone quality is the outstanding characteristic of Ware Neutrodyne Receivers; the ability to receive the broadcast programs with absolute naturalness, free from distortion, and to render musical programs in all their original perfection.

THE sensitivity and selectivity of the Ware Neutrodyne Receivers are remarkable. Nearby broadcasting stations are tuned out, and the desired station brought in at the will of the operator.

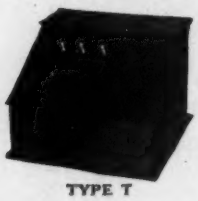
The different instruments are illustrated and described on each side of this page, from the moderate priced but highly efficient Type T to the beautiful cabinet model Type WU, with its powerful equipment and great range of reception. But every one of them has the same wonderful Ware tone quality.

Types T and X are our new reflex Neutrodyne circuits, giving the equivalent of one additional tube in each case; and they are the first neutrodynes to be operated successfully with dry cell tubes.

There is a sense of pride in the ownership of a Ware Neutrodyne Receiver that is fully justified by its performance.

To obtain the utmost satisfaction, investigate the various receivers on the market, but be sure to hear the Ware before reaching a decision.

Send for Catalog



TYPE T

Mahogany cabinet, 10¾" high, 14" wide, 13½" deep. Dry-cell "A" and "B" batteries enclosed in cabinet. Reflex Neutrodyne circuit. Three dry cell tubes, one reflexed; equivalent to four tube circuit; one stage tuned radio frequency amplification, detector, two stages audio. Operates loud speaker. Outside antenna.

$85.00 without accessories

TYPE X

Walnut cabinet, 8½" high, 21½" wide, 10¾" deep. Dry cell "A" and "B" batteries enclosed in cabinet. Reflex Neutrodyne circuit. Four dry cell tubes, one reflexed; two stages tuned radio frequency amplification, detector, two stages audio, equivalent to five tube circuit. Double-scaled voltmeter indicates voltages of "A" and "B" batteries. Indoor or outdoor antenna.

$150.00 without accessories.

TYPE W

Walnut cabinet, 8½" high, 21½" wide, 10¾" deep. Neutrodyne, not reflexed, using five vacuum tubes—two radio, detector, two audio—and storage battery. "B" batteries enclosed in cabinet. Double-scaled voltmeter indicates voltages of "A" and "B" batteries. Indoor or outdoor antenna.

$175.00 without accessories.

TYPE TU

Brown mahogany or walnut cabinet, housing Type T circuit. Panel exposed by raising lid. Loud speaker concealed behind grille. Dry cell "A" and "B" batteries enclosed in cabinet. Dimensions: 34½" high, 18½" wide, 18¼" deep. $150.00 without accessories.

TYPE XU

(See WU for cabinet open)

Brown mahogany or walnut cabinet, with panels of contrasting shades. Embodies Type X circuit. Loud speaker concealed behind grille at top, below which a desk leaf turns down, exposing the panel. Dry cell "A" and "B" batteries enclosed in cabinet. Dimensions: 44" high, 27¾" wide, 18¾" deep. $275.00 without accessories.

TYPE WU

(See XU for cabinet closed)

Brown mahogany or walnut cabinet, with panels of contrasting shades. Embodies Type W circuit. Loud speaker concealed behind grille at top, below which a desk leaf turns down, exposing the panel. Storage and dry cell batteries enclosed in cabinet. Dimensions: 44" high, 27¾" wide, 18¾" deep. $300.00 without accessories.

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VOLUME 12

THE WIRELESS AGE

"America's Foremost Radio Magazine"

NUMBER 1

The Dawn of Radio in Politics

By WILLIAM A. HURD

THE presidential campaign of 1924 is now drawing to a close. It is the nature of American partisan government to occasion well nigh hysterical interest among the citizens for a few weeks before each presidential election. But a few weeks after * * *

Any régime that does not directly menace nor annoy the voter is acquiesced in no matter how preposterous. In fact the voter's nature seems to be to think as little about political affairs as possible and to stop thinking about such things as soon as possible. And he even resents any implied criticism of the government as though he had some subconscious fear of being isolated or lost from the herd if any upset should occur.

What effect is radio apt to have in the future in bringing the citizen to a realization that political affairs concern him vitally, not alone for just a few weeks once in four years, but every hour of every day and every day of every year?

Radio furnishes the means by which the whole people can be reached direct—any hour of any day. And thus correct the unwieldy and hitherto impossible difficulties of the direct participation of the governed in government, which is democracy.

Democracy is the ideal principle toward which mankind tends as the evidence of history plainly shows. From the absolute despotism of not so long ago the constitutional monarchy was but a step. And now that the Caesars and Czars and Kaisers and Kings are passing from the governments of mankind there are but two ruling principles remaining through which ambitious office seekers may gain control of the affairs of state.

Prior to the advent of radio the sheer intricacy of governmental affairs forced the adoption of the republican principles. These principles being that certain statesmen must be chosen by the people at stated intervals to take charge of affairs until such time that they shall prove unworthy or the legal limit of their term of office shall be completed; but that during that term they shall be held responsible in their person for governmental acts, the direct participation of the governed in government being regarded as a mere interference, an interruption or blocking of a tremendously intricate process.

As a matter of plain fact, the instructed delegates, the farm blocs, the trade union representatives, and above all, the lobbies of capitalistic interests, to say nothing of the Ku Klux Klan and other organizations of similar intent, have all been an interference, an interruption, a blocking of a tremendous intricate process.

But do these special interests truly represent the vast mass of mankind? Mankind is surely not farm blocs, trade unions, lobbies nor Klans, but essentially a tremendously complicated combination whose one great common denominator is—The Family.

ARISTOTLE claimed that man is a political animal. In direct contrast with this, H. G. Wells points out that man is primarily still a family animal with all the instincts of the family tri' ». A moment's reflection would seem to bear o t this assertion. It is true that the real life of the average man is his everyday life. His little circle of affections is after all but a passing incident in his social advancement. His fears and hungers, his lusts and imaginative impulses are a thing of a day. It is only when his attention is directed to political affairs as something vitally affecting his personal sphere that he brings his reluctant mind to bear upon them—that he is willing to relinquish the contentment that is his within the very narrow confines of his personal circle.

And so it is not strange that this social and political advancement has seemed slow. Nevertheless, he has come from little more than a soulless brute in little more than a few score centuries to the present when he is appealed to from every source of social communication as the real ruling power.

Is it not possible that the spirit or impelling force underlying the blocs, lobbies, etc., is but the present manifestation of the trend toward practical democracy?

The great mass of mankind is, in addition to being a family animal, distinguished from other animals by the use of tools; which has brought him at last to the greatest single tool for common and general education, and forward marching social enlightenment—The Radio.

It is by radio that he can be aroused to wide apprehensions of danger in his social life, and through this means come by example to know, and by good education to acquire, the scientific habit of mind of wanting to know *why*.

Then he should respond effectively to political affairs as vitally affecting his personal circle every hour of every day, and every day of every year. We will be no longer disturbed by this lusty-lunged infant—blocs, lobbies, etc.—but will find that ideal youth who will with radio broadcast towers inscribe across the sky of the future—DEMOCRACY.

And then for the first time mankind will know and understand the real significance of direct participation of the governed in government.

For in the words of Wells, ". . . in the background of the consciousness of the world, waiting as the silence and moonlight wait above the flares and shouts, the hurdy-gurdys and quarrels of a village fair, is the knowledge that all mankind is one brotherhood, that God is the universal and impartial Father of mankind, and that only in that universal service can mankind find peace, or peace be found for the troubles of the individual soul . . . "

The Beginning of a New Political Era

Radio has given the people an insight into the workings of politics that may have a far-reaching effect upon the election of candidates

By Hubert Work
Secretary of the Interior

THE solidarity of representative government rests upon the sense of responsibility of its citizens. In America, fortunately, we find the natural student of public affairs, in all walks of life. When every man on the street is a potential president, it may be truly said that America is a nation of politicians. It is this innate political sense that has made our Republic the greatest on earth. It is the continual fomentation, incited by diversified political views, that keeps us from growing stale like many old-world governments, and brings to the surface new political leaders and ideals in every national crisis. The waning of this common interest in public affairs would mark our approaching decline as a nation, an untoward change difficult to imagine amidst the brilliancy and power of our Government of today.

That our people are far from political apathy, however, is demonstrated by the universal interest in the presidential campaign now being waged. Never before has a contest been conducted on such a stupendous public scale, because this is the first time in history that candidates for office and their supporters have been able literally to pierce the walls of the home with their voice and find ready listeners to their views.

Besides multiplying the speaker's audience many fold, radio has given the people an insight into the workings of politics that may have a far-reaching effect upon the ways and means heretofore pursued to secure the election of candidates. Any one who was within range of a radio receiver during the Cleveland convention found his appetite whetted for more; nor was he disappointed when he listened in to the more exciting sessions of the Democratic convention in New York.

It is safe to assume that the experiences encountered in the conventions of 1924, because of the radio, will revolutionize the next national conventions four years hence, just as it is already changing the character of political campaigns. The cause is fundamental.

The orator who depends upon gesture and facial expressions to drive home his arguments when he faces an audience, must depend on his facts and logic when he speaks through a microphone.

He approaches an unresponsive mechanical device that is apt to embarrass the most seasoned public speaker. He misses the stimulus of being en rapport with his audience, and while the microphone and receiving set reproduces his voice with fidelity, it does little more. If he has a good "radio voice" he is fortunate, since many speakers who have won fame on the rostrum find that when shorn of the graces of public speaking, such as gesture, physical appearance and all the other characteristics that go to make up the speaker's personality, they are unable to hold their audience.

The result is that radio speakers are giving more attention to content rather than embellishment in preparing and delivering their political talks. There is no place in radio for the verbose, illogical and defamatory type of political oratory. Brevity—always one of the elements of good writing and speaking—becomes paramount over the radio; and denunciations of an opponent that may be greeted with applause when delivered from the platform, directly to an audience of the same political faith, fall flat when heard in the quiet of the home.

The radio is destined to promote accuracy in newspaper accounts of public events. Headlines will no longer mislead, for the reader will have received information of the event direct by radio before it is chronicled in the newspaper, and the newspaper writer, like the radio speaker, will have to confine himself more closely to facts. I have mentioned before the influences which affect our reason and judgment, and return to the subject again because it is the fundamental purpose of all argumentative writing and speaking. Since political speeches are purely argumentive in character, theoretically at least their primary purpose is to persuade the hearer to the speaker's viewpoint politically. One way of persuading the audience is used by the stump speaker, who attempts to arouse them to such a pitch of enthusiasm by his personality that they forget to use their reason or question his facts. America has had some famous "spellbinders" in its political history—men of genius who cannot be replaced by the present generation and whose passing denotes the close of a definite epoch in political speech-making.

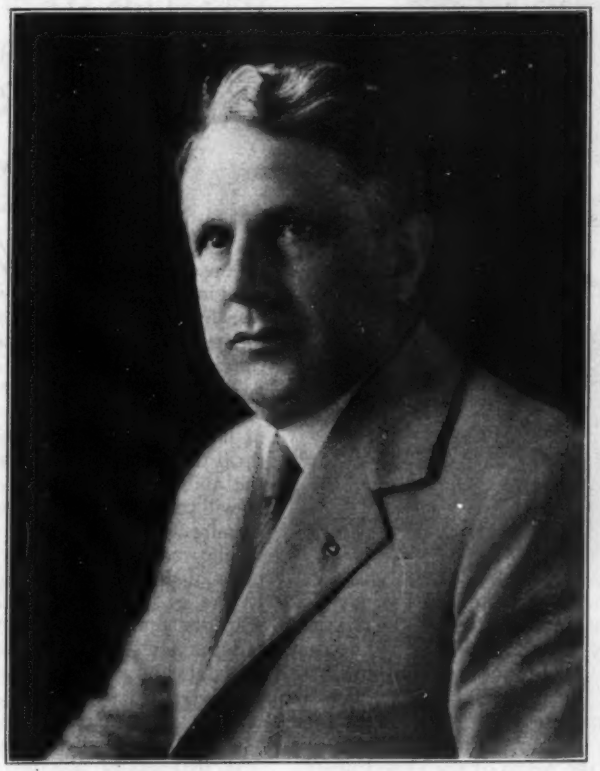
The radio marks the beginning of a new era. Those who are destined to make a name for themselves in this difficult field must rewrite their speeches and recultivate their voices. With brevity, logic and a firm adherence to facts as their guideposts, they will fail to appeal to the passions of their audience perhaps, as did the spellbinders of old, but their influence on the reason and judgment of the "listeners-in" will be immeasurably greater and the consequent improvement in our political standards will raise America to even a higher place among the nations of the world.

Promoting International Understanding

Through radio we are binding ourselves not only more closely commercially to other nations, but more firmly in thought as well as deed

By James J. Davis
Secretary of Labor

TWO-THIRDS of China live in one-third of its area—that's what I have been told, and since I have never been there I have to take another's word for it. But whether this proportion be too small or too large we all can reason that the first element of civilization in the modern sense is transportation; its progress depends upon commerce in some form—of beings, of goods, of thought. In the unpenetrated regions of Mongolia where it is reported that even the wheel is unknown, and water transportation is extremely limited, civilization cannot exist. For man is a social creature that takes most from life when greatest is his contribution in intercourse and commerce. He lives most who serves most.



The romance of ships is inspiring—I never see the incoming or the outgoing of an ocean liner but that my mind wanders to the ports which it has touched or will touch in the future, and as my mind wanders to unknown lands I marvel at the progress of transportation facilities. Nothing is more thrilling in history than the development of navigation, first by drifting, then by paddle, by sail, by steam, by electricity, and even by radio. Nothing is more brilliant in the story of American achievement than the difficulties surrounded by the ever increasing efficiency of our means of commerce. The courier was displaced by the stage, the stage by steam, steam by wire, and wire by radio. But what has been true in America has been true in other civilized portions of the globe. And with each progression the world has grown smaller, the drudgery of labor has been lessened, and the comforts of mankind increased.

We need no one to suggest to us that the remarkably rapid advance in the invention of labor-saving machinery during the past generation is due to improved means of communication. Minds of men work so differently that without the communication of an idea, as in the case of a simple wheel turning upon an axle, it may remain unknown in another part of the world for countless centuries, yet once transmitted a different mind may develop that original product for beyond what an enthusiastic inventor ever dreamed was possible. We know that this has been true in radio.

The world has grown smaller by better transportation, nations understand each other better by commerce and new mutual benefits and responsibilities have been created by the interchange of commodities and mingling of international society. Yet withal, this development has been of a material nature. The thought of an individual may be guarded—words and acts of individuals may not reflect public sentiment because of the circumstances which surround that individual in a given situation. Men are often biased by physical contact and do not give expression to their innermost thoughts. But if a nation and the family of nations has gained so much through physical transportation — that of peoples, of commodities, and of the written word—what may we expect with the broadcast dissemination and exchange of ideas by word of mouth intended primarily for a class but open to all. We have encouraged open diplomacy but how can that compare with the openness of communication upon which the whole nation and the world may tune in?

During the past year we have had considerable demonstration of the possibilities of unlimited dissemination of thought in public affairs. Conventions of leading political parties have been open to the public and millions have come to understand the forces behind party government who otherwise than through the development of the radio must of necessity remain totally ignorant. No hall or other meeting place would be able to accommodate even a small percentage of the vast numbers who now are enabled to listen to the discourse on national affairs of leaders in social administration. Many are the times that I have walked miles to be jammed into a crowded hall when only a half-way prominent leader was to speak. And while I usually succeeded in getting into the audience, how often have I seen hundreds turned away?

The enfranchisement of woman has not decreased her natural responsibilities and the natural ties which keep her in the home. Yet if we are to have reflected in our elections unbiased and carefully thought out principles of government every voter should have an opportunity to hear and to analyze the views expressed and the acts explained of those who administer our affairs or believe themselves qualified to carry on the business of the greatest government in the world. To those who cannot attend the public meetings held for purposes of enlightening the public on affairs of national administration, whether from family ties, physical disability or inaccessibility, the radio is indeed a useful agency.

I am not so sure but what those who get their impres-

(Turn to page 62)

The Harmonizing Effect of Radio On Our Social Order

Creating Interest in Public Matters Has Been Largely Solved By the Introduction and Use of Radio

By Edwin F. Ladd

United States Senator from North Dakota

THE greatest danger to the perpetuity of free government is the indifference and apathy of the average citizen to his privileges and duties in connection with public affairs. The age-old question of how best to create an interest in public matters has been largely solved by the introduction and use of the radio as a means of enlightening the people.

The radio is no longer in the realm of the experimental. Millions of citizens of the United States have recently had a very practical demonstration of what the radio means to the general public. Heretofore, the national conventions of the different parties had very little meaning to the average person for the reason that only a very small percentage of those affected by the outcome of the convention had the opportunity, time, or means to attend these great national gatherings, but the radio has brought the convention to the very doors of millions of American families. What could be more educational than to have all the members of the household sitting in comfort in their own homes listening to the proceedings of the different sessions of the national conventions? They can even hear first-hand the responses of the delegates whom they selected to represent them at the convention. The public, generally, and Alabama, in particular, will long remember the announcement of the Chairman of the Alabama delegation at the Democratic National Convention held in New York in June in response to the one hundred and three roll-calls—*"Alabama casts twenty-four votes for Oscar W. Underwood."*

In the not distant future, the farmer will no longer need to hitch up Old Dobbin or crank up his tin Lizzie, bundle in his wife and all the members of the family and then drive thirty or forty miles to hear the candidate or opponent of his political belief discuss the complex questions of the day. He will be able to sit at ease by his own fireside and have the pleasure of hearing at first hand the representative men of the country analyze the distinctive principles of the different political parties.

The universal use of the radio will have a leveling effect on the social order. The farmer, laborer, and individual of limited means will be able to enjoy and experience the thrill that comes to those who listen to the orator who has the ability to voice their feelings, needs and aspirations as will the business and professional man and the multimillionaire.

The radio will also have a very salutary effect on the press of the country. It is perfectly natural that the newspapers of today reflect the political sentiment of those who are financially responsible for their very existence, but the fact that the readers of those papers now have access to the radio will have at least a deterring effect on the reporter who might, under former conditions, be tempted to put too much coloring in his news items.

It will also tend to brevity on the part of the speaker. The listeners-in will not be compelled to punish themselves by having to listen to a speaker who does not confine himself to the issues now pressing for solution. Without embarrassment to any person concerned, they can relieve the situation at any time by turning off the receiver.

It will not take the average speaker long to learn that in talking to a radio audience he must confine himself to facts, and in the last analysis if a candidate cannot win on the basis of facts, he is not entitled to win. From my study of history, my observations, and my personal experience, I am thoroughly convinced that the people can be trusted to do what is right if they have the facts to guide their judgment.

If one were to sit down for a few moments and make a list of all the inventions and discoveries of the last hundred years, he would be startled at the wonderful developments and progress, but giving full credit for all the benefits derived from all the other discoveries, it is my belief that as an educational factor the radio excels them all. If the radio can be kept in the future as free from censorship as it is today, there is no telling what the future has in store for us. Let us hope that the day may never come when there will be any discrimination in favor of the few as against the masses in the use of the radio.

The Foundation Laid by Radio For Our Social Edifice

The Nation Is Facing a Better Day in Its Already Illustrious History

By Dwight F. Davis
Assistant Secretary of War

DUE in no small part to radio broadcasting the imminent national political campaign will be waged among a better informed electorate than perhaps ever before in history. Radio has undoubtedly caught and is holding the fancy and interest of the American people to an extent not approached either in extent or intensity in the last two generations by anything except possibly the automobile. The advent of broadcasting marks an epoch quite distinct in its characteristics in the advancement of our people, and this period is bound to reflect at least the acquisition by the great majority of our citizens of a body of knowledge unequaled in any similar length of time—largely through the popular prevalence of broadcasting.

Radio will count heavily in the plans of the managers of the political parties in their endeavors to convince the voters of the justice and practicability of their platform principles and the adequacy of their candidates. There are necessarily limitations to the use of this means of spreading information and argument. In many cases speeches must be carried by trunk telephone lines from the point where the speech is delivered to the broadcasting stations. Only a certain number of telephone lines can in any event be used for this purpose. The expense also is a considerable item; broadcasting will be paid for by somebody. With heavier total sums to be expended this year in a campaign among a more numerous electorate than ever before, the cost of using the radio will require careful thought on the part of those who must collect and account for these funds.

Every family does not have a radio receiving set. That at once imposes a limitation upon the effect broadcasting will have. Every voter cannot be reached by this novel means. Many millions must still be politically informed and convinced through the press—the newspapers and magazines. Even these agencies fail to get the attention of millions who read very little beyond the headlines; and these people must be interested by the personal contact gained in political rallies and meetings.

I mention these limiting factors in this consideration of the effect of rado broadcasting in politics, though to many individuals they may seem too obvious for presentation, because my observation is that a great many of us have accepted radio, especially if we have a receiving set in our own home, as an already permanent element in the home and daily life of all Americans. These limitations, of course, as the rapid and fascinating progress of radio shows, will be eliminated to a great extent in the future, but from the standpoint of the present struggle they must be admitted to be weighty. It is likely that the leading candidates, especially for the offices of President and Vice-President, will have their talks broadcast to practically the entire country. Some few of the best party orators also will receive this great attention. But in the main this will not be true. The circle influenced by the average radio speaker will be confined to his immediate town or district. This in itself places bounds upon the use to which radio can profitably be put at present in politics.

Speeches over the ether will be shorter than at the old-time political gathering. There will be less of exaggeration and more of fact in the talks. Tuning in is easy these days; cutting off an uninteresting speaker will be just as easy and very likely quickly employed when the occasion demands such action in self protection. In the dispassionate surroundings of the home and friend-circle what is offered can be rigidly analyzed. If the substance is not there, the response cannot be favorable, and the net result will be but the forming of a bad impression or the effacement of a half good impression previously formed. The radio speaker has much to gain by his enlarged audience thus potentially placed within his voice, but if he does not put his stuff across he correspondingly runs the good chance of losing just as much. The effects of radio can work both ways.

I do not have the figures, of course, of the sales of radio receiving sets in both rural and municipal communities. This information would make very informative and interesting reading and would permit one to make some helpful conjectures as to the parts of the country which will be most affected by radio broadcasting in the present battle. I have thought that the folks in the rural districts have read

(Turn to page 62)

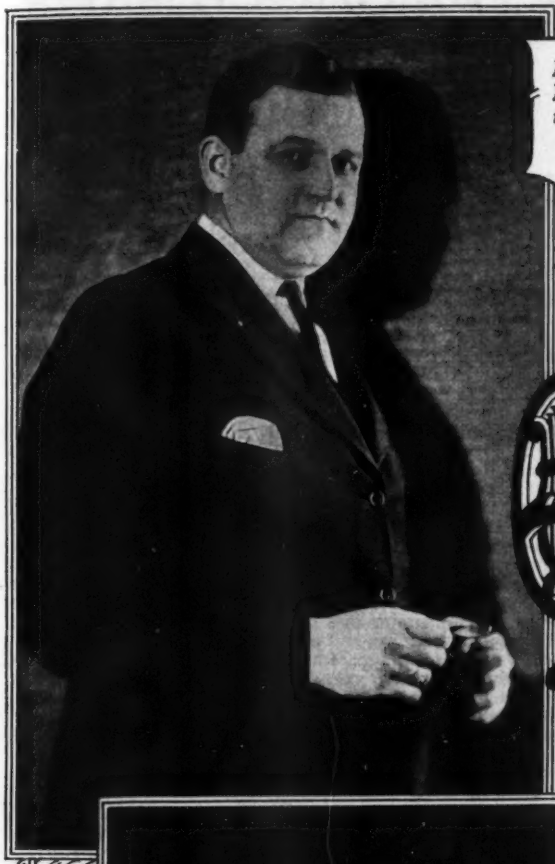
On the Radio Rialto

A fight scene from "Pierre of the Plains," which was produced by the WGY Players at the Schenectady broadcasting station of the General Electric Co.

The New York Philharmonic Orchestra under the direction of Willem Van Hoogstraten was broadcast tri-weekly direct from the Lewisohn Stadium, by station WJZ

One of the feature numbers of the latest edition of the Greenwich Village Follies will be a Radio number. John Murry Anderson is demonstrating how a receiving set can brighten the faces of these young ladies who are ordinarily very sad

Prominent Artists



Fred Hughes, New York Entertainer at Station KQV

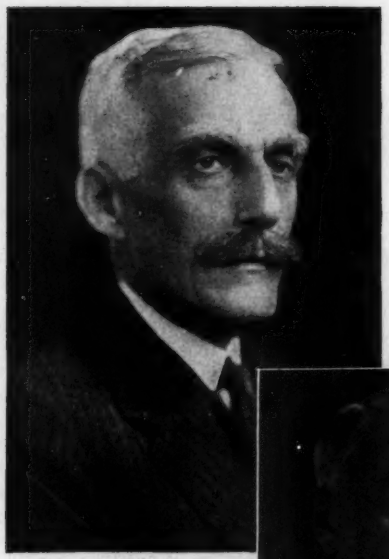
Ethel Miller, mezzo soprano, who broadcast from Station WJZ

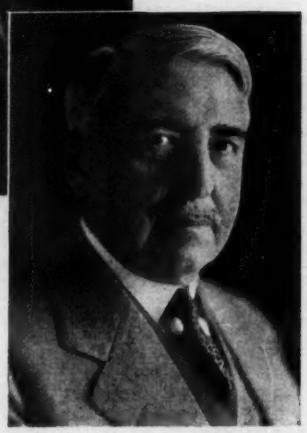
Leila Wilson-Smith, Dramatic Soprano at Station KQV

Morgan L. Eastman, Musical Director at Station KYW

How Broadcasting Affects Our

The Opinions of Our National
Exclusively for





(Top) Andrew W. Mellon, Secretary of the Treasury and (right) William M. Butler, Chairman of the Republican National Committee

HERBERT HOOVER, SECRETARY OF COMMERCE

RADIO interconnection is the next and most vital step in the field of all human communication. We have today about six hundred local broadcasting stations. We all know that the local station can give better service than those far away. Our available wave lengths permit us to have from two to four nearby stations available to every listener. It is thus possible to have two to four alternate local programs at the same time. While programs of local origin will play a large part in broadcasting, yet radio will not have reached its full service until we have such interconnection of our local stations that we may also enjoy each night the product of our greatest artists and the thought of our leading men and women, and may participate in great national occasions.

All this will add not only great intellectual and stimulative force to the nation, but it will materially help to build up home life. For in the comfort of our own firesides, father can smoke, mother can knit, and the family can make remarks upon the performance in terms not permitted in public places.

Our governmental relationships to this particular problem are complex in administration, simple in principle. We seek to preserve the ownership of the road through the ether as public property that we may maintain initiative by holding it a free field for competition; to keep alive free speech; to avoid censorship; to prevent interference in the traffic.

A. W. MELLON, SECRETARY OF THE TREASURY

THE successful broadcasting of the recent Republican and Democratic National Conventions showed to what extent radio can be used in the campaign. For the first time, the people could actually hear what their representatives were doing and saying; and those who addressed the conventions had an unprecedented opportunity to impress their personalities on the country. The speakers' arguments, their language, and the very tones of their voices became familiar to thousands who would never have read long, detailed accounts of speeches and roll calls. Yet this great radio audience was not only willing but eager to listen to the actual proceedings themselves.

This fact, of course, presents tremendous possibilities to the managers of the various political campaigns now getting under way. It means that candidates for nationl offices can now address large gatherings without raising their voices. Substance in thought, not vocal power, will be required of public speakers. A President may now speak to the entire country without the strain of swinging round the circle, a physical effort too hard for any one to add to the responsibilities of his position.

The use of the radio, however, is subject to certain limitations which campaign managers will do well to remember. First, the facilities for extensive broadcasting are limited practically to the capacity of the land wires of the telephone companies. These companies must maintain their usual service, which will make it possible to broadcast only a limited number of the most important speeches. Second, the speeches should be short and to the point; otherwise the unseen audience will become tired and melt away without the speakers even being aware of the fact. The conspicuousness of leaving a hall before the end of the ceremonies does not exist where one can tune out by the mere twist of a knob. It must be remembered also that radio audiences are composed of persons of every political persuasion, and, if speeches are to carry conviction, they shold be free of abuse and present an intelligent discussion of issues in a dignified way.

All these things must be taken into consideration if radio is to achieve the maximum amount of usefulness. Already it has aroused greater interest in politics on the part of many who were formerly more or less indifferent as to how their Government was run. If this interest can be stimulated and maintained, radio will render a service of the greatest value in the further development of representative government in this country.

SENATOR JAMES W. WADSWORTH, JR.

RADIO broadcasting will enter into the calculations of every political manager and party organization from now on. The widespread and deep interest displayed by the public in the proceedings of the late national political conventions made radio an asset not to be overlooked in the means used to convert the electorate to one or another way of thinking and voting. I think it is conservative to say that no meeting in the history of man was so closely followed word by word by such large numbers of individuals as the recent National Democratic Convention at New York. Very many people made it a practice during those two weeks to stay at the loud speaker or ear phones till the last word of each session had been said, though that last word was spoken sometimes at three in the morning.

There are some folks who never attend political gatherings. They wish to read at home what each side has to offer and to analyze it coldly in the truth-attaining home circle where facts are faced willingly. These people are not carried away by the group influence so prevalent in crowded meetings. To these in particular, as well as to those who cannot at this time get out to meetings even if they so desired, the radio will especially appeal. And, because the personality of the speaker, comprehending his appearance, pleasant manners and ease of approach, and his facial expressions and gestures, cannot be brought to the audiences over the ether, the SUBSTANCE of what he has to say will have to be better than in the past. The political featherweight will evade, if possible, the sending end of the radio business.

In the rural districts raido will, perhaps, have its greatest effects politically. Staying at home is more of a necessity to those living apart from communities or in small ones. In bad weather meetings are almost sure to be poorly attended in the country. Radio solves to a wide extent this problem, and the rural vote this Fall may be the greatest ever, due, in some measure, to the prevalence of receiving apparatuses in farmhouses.

Due to the non-partisan attitude necessarily a part of the radio broadcasting business, the radio audiences will hear by this means both sides of the issues of the campaign. The foundations of this republic are securely laid in the knowledge and morality of the people.

Political Speeches Politic Body

Leaders in Statements Made WIRELESS AGE

WILLIAM M. BUTLER, CHAIRMAN OF THE REPUBLICAN NATIONAL COMMITTEE

CITIZENS who heretofore regarded politics merely as incidents in the life of the nation now have, thanks to the radio, a keener insight into and a fuller appreciation of political activities.

I have been impressed with the fact that the November election will come nearer expressing the will of the people than any which we have recently held.

There is no denying that the general broadcasting of the Republican and Democratic Conventions has given the people a more direct interest in the campaign than they have ever had before. Millions of people through the radio were able to sit at home and hear the wheels revolve themselves. They feel they have secured insight into political activities which they never before enjoyed. As a result, there is more sober serious thinking of the campaign as something vitally connected with the prosperity of the nation rather than merely a contest for office between candidates.

I think those of us who listened in must all have had sober moments when from the convention halls the actual voices of the delegates came to our ears, as well as the disturbances and interruptions.

This largely explains the extraordinary number of letters and telegrams I have received from citizens who now have a fuller appreciation of their individual duties in politics, who are now setting forth their desire to aid in our campaign, and who stand ready to serve.

The election belongs to the people. I have considered this so important that I have already advised our national committee men and women, our state chairmen, and all associated in the campaign that I am particularly anxious they should encourage in every way the participation of the people in the actual campaign activities. Our campaign will be one in which all may have a part. The radio also will have an important part.

THEODORE ROOSEVELT, JR., ASSISTANT SECRETARY OF THE NAVY

THE radio is unquestionably a real political asset in the broadest sense of the term. As this country is a republic, it stands or falls on the intelligent interest in political affairs of the average of its citizens. To this intelligent interest, the radio makes a real contribution. By it, speeches of the prominent men and women will reach audiences infinitely more numerous than in the past. Furthermore, I believe the audiences reached will be composed in large measure of those who are not likely to attend a political rally. The gain, therefore, is net—not gross. We have only begun to scratch the surface in our radio work. The future should hold an even greater development.

SENATOR ROBERT M. LA FOLLETTE

THE radio is destined to play an important part in the present political campaign. If properly and effectively used, the radio presents an opportunity for the candidates to speak directly to the American people and present the issues as they see them. The people can then form their judgment and vote their decisions at the polls in November. This is genuine democracy.

The true progressive welcomes every new triumph of science and is only concerned to see that it is used for the public benefit. The radio is one of the most wonderful of all inventions and is capable of contributing greatly to the enlightenment of all the people and the enrichment of their lives.

(Top) Herbert Hoover, Secretary of Commerce and (left) Theodore Roosevelt, Jr., Assistant Secretary of the Navy

CONGRESSMAN NATHAN D. PERLMAN

I AM not a Prophet nor the son of a Prophet. I was not born with a veil on. Nevertheless I am willing confidently to assume the rôle of a Prophet in this one matter and let WIRELESS AGE check up on it a generation hence.

Radio will work the most complete and, as yet, the most undreamt-of changes in the political life of our country.

Not merely because a speaker can reach a greater number of people over the radio than in one assembly hall, nor because he can say all he wants to and the public will listen, instead of skipping paragraphs here and there as in a printed page. I refer to an entirely different phase of the question.

The past history of politics has at times been a history of corruption because secrecy was possible. But the full light of day floods a matter where everyone may listen in and a more wholesome attitude results.

Radio opens up every political assembly to the attention and interest of the entire world. It is estimated over twenty-two millions of persons listened in on the recent Republican and Democratic National Conventions and for having listened these men will be in a better position to vote intelligently.

SENATOR DUNCAN U. FLETCHER

RADIO, as was demonstrated at the recent Democratic and Republican National Conventions, will figure to a considerable extent in the present political campaigns. It is a new force to be reckoned with in the discussion of issues of the day, supplementing the older methods of campaigns, namely, the printed word and stump speaking.

Radio, unlike the prevailing method of addressing the body politic, has the advantage of reaching vast multitudes almost instantaneously. Electric waves transmit with the speed of light—186,300 miles a second—and by the interlinking of broadcasting stations it is possible for a speaker to address a nation-wide audience.

Radio, while it will not revolutionize our present methods of campaigning, will modify some of our ways of addressing the voters. It will mean that the candidate appealing to a radio audience will have to carefully choose his words and appeal to the reasoning faculties of the hearers.

This thing of arousing interest should tend to bring out the voters on election day, meaning a larger participation of the electors in the actual choice of those to serve in public office, and that, alone, would be a great and beneficial accomplishment. It means the spread of information, educational in character, a wider consideration of the issues involved, and a stimulation to the fuller exercise of the franchise, so essential in a government controlled by the governed.

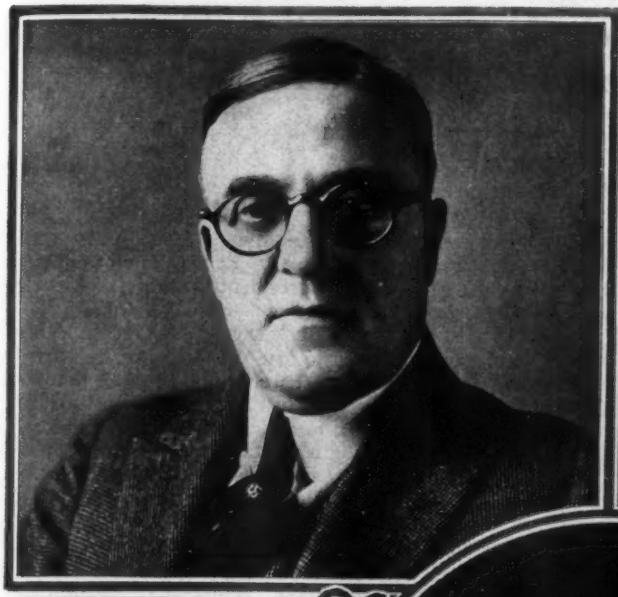
Broadcast Entertainers

Charles Bryden, Lyric Tenor, one of the chief entertainers at THE WIRELESS AGE *party broadcast from WJZ. He is one of the most popular broadcasters*

Miss Hilda Ramon, Mezzo-Soprano, another of THE WIRELESS AGE *party. Her work with Mr. Bryden has won them both an enviable reputation*

A concert played at a Schenectady theater by the Filipino Orchestra of the "Leviathan" was broadcast by WGY. In addition to the members of the orchestra are, (front) left to right, E. E. MacNary, general passenger agent of the United States Lines; Helen Gleason, soprano; Mrs. J. F. H. Turner, director of feature programs at WOR; Anna Rose, soprano, and J. F. H. Turner, director of radio programs on the United States Lines

Voices You Hear Nightly–Announcers Who Are Popular With the Invisible Audience

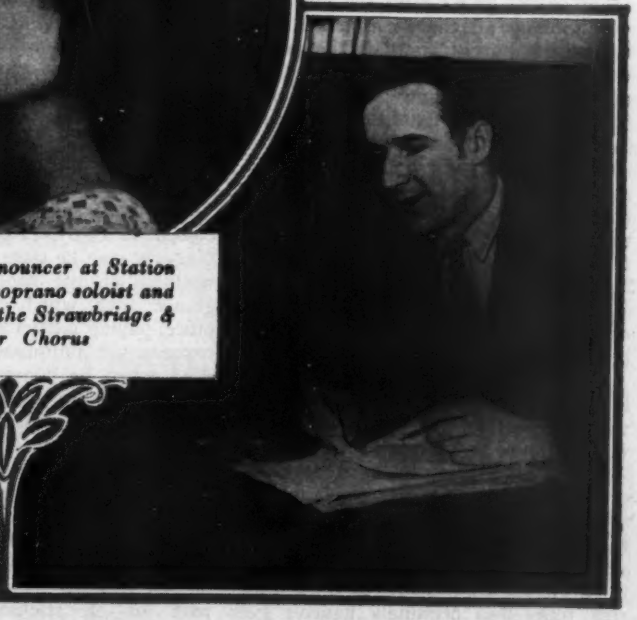


L. W. Zimmerman, studio and program director of WTAN. He has a "radio" personality that appeals strongly to listeners

G. C. Arnoix, chief announcer and program director for WBAP. He is best known to the radio audience as "G. C. A."

Aleta Smith, announcer at Station WFI. She is a soprano soloist and also member of the Strawbridge & Clothier Chorus

"Uncle Bob" (Walter Wilson), famous KYW bed-time story teller, feeding the elephants at Sells-Floto Circus



Logan (Steve) Trumbull, chief "World Crier," announcer, broadcasting from Westinghouse station KYW

PER LAND LINE

The Sheriff of Gold Creek Bought a Radio Set—But He Hooked the Aerial Over a Telephone Line—And Then the Fun Did Begin—All Because of What He Heard

By F. R. BUCKLEY

Illustrations by A. E. Porter

ACCORDING to some inhabitants, the town marshal of Gold Creek, Texas, is by nature a cruel monster consisting entirely of fists and revolver-barrels; and on the contrary, according to others he is a sort of monument of corn-meal mush sweetened with saccharine. This is kind of a confusing state of affairs; but fortunately, being the town marshal myself, I am in a position to clear the reader's mind by assuring him that as a matter of fact, I am neither too rough nor too gentle; and that I conduct the office of town marshal exactly in accordance with my ideas about how it should be run.

Before giving an example of this, I should like to explain that the rumor of my gentleness, not to say inattention to duty, started in the ranks of the extremely rich, such as Mr. Homer Blenkinsop of the Bar T, and Mr. J. V. Wilson, of Stony Springs, on account of my going after the guy who was robbing all the local mail-trains, instead of concentrating on the jasper who was making the round of their ranch-houses, stealing silver spoons and the like of that. On the other hand, the yarn about my being a cruel ruffian was started by the criminals of the district, because after this train robber had shot me eight times during the ceremonies of capture, I went so far as to shove a revolver barrel down his throat and to drop a small rock—it can't have weighed more than fifty or sixty pounds at the most—on his left temple.

Well, of course, prejudiced opinions like these didn't worry me; but when I was confined to my house and office with wounds as aforesaid, it did seem kind of tough not to have anybody dropping in and saying "How, Ben, you poor old dog-fish" or the like of that. Of course, the punchers were still strong for me, but punchers are busy guys; while spare time is what rich folks and criminals haven't got anything else of but. And while I was sitting all alone in my office, too badly wounded to even start spending the thousand dollars reward I'd collected for this robber, the rich and the criminals were amusing themselves by getting their opinions into print, in the Gold Creek *Weekly Bugle*. It was pretty tough for a wounded man, looking through the paper for 'Advice to the Heart-Sick,' which I always read first, to come across an article by Pro Bono Publico, calling him a rubber-spined sentimentalist, while "Slippy Dick" in another article, used the terms "Bluebeard," "Were-wolf," "Blood-slavering Monster," and "Sanguinary *Ben* Pokeson."

You can tell how low I was in my spirits when I say that I positively welcomed a man who stuck his head in at the door and said "Mr. Pokeson? Yes. Can I interest you in—"

"You can interest me in anything," says I, noticing with interest how close his eyes were together. "I'm so bored, you could interest me in an account of the Chicago World's Fair, even without lantern-slides. Close the door behind you, if you would be so obliging, and take the best seat there is. There are the cigars, and on the table behind you you'll find brown papers and tobacco in a sack. How are you, now, and I hope your family is enjoying the best of health?"

He didn't seem used to being welcomed, that guy. I could tell it by the gingerly way he closed the door, to say nothing of the rapid and thorough glance with which he examined my office, paying particular attention to the corners not illuminated by the lamp. And when he commenced his selling talk, it sounded as though the natural moisture of his throat had disclaimed responsibility, and had told him to go ahead without it.

"I—can do—better for you than—the world's fair," says he, smiling nervously and depositing upon my table an awkward-looking object which he had hitherto held to his bosom, with part of it sticking-over his left shoulder. "Brother, I'm—er—goin' to bring the whole wide world right bang into this room, an' start it to work amusing you. I am going to introduce you to Paul Whiteman, Fritz Kreisler, President Coolidge, and Uncle Wiggly. I am—er—"

"Go on," says I, as he suddenly seemed to lose the thread of his narrative. As I write this, I realize that his eyes had just fallen upon a pair of handcuffs which I'd dropped when returning after the capture of the train-robber, and which I hadn't had ambition enough to pick up, since. But at the time, I was too desperate for company to notice anything.

"In short," says my visitor, looking at the door again, and swallowing something. "I am here to interest you in a radio set."

"Is this it?" I asked.

"Yes," says he.

"How much?" I inquired.

"Te—er—thirt—no—twenty-five dollars," says the salesman; and right away I began to get all thrilled up. The thing he had on the table was about a yard long, and had four electric lights inside of it; while to my certain knowledge, Bill Garfield, who is sheriff over in Three Pines, had paid ninety dollars cash for a runt of a thing giving so little light you could hardly read a newspaper by it.

"We are making you a special low price to introduce this type of machine in your neighborhood," says the salesman. "It's what we called a—er—double static subheterohelix."

"It sounds cheap for the money," says I.

"And it is cheap," says the salesman, kind of recovering his self-confidence, and working a gadget that lit the radio set all up inside. "It's a very extra-special bargain, personal to you, to convince yourself and your friends that—"

"Well, how does it work?" I asked, feeling that we had better not penetrate too deeply into this question of how many friends I had.

"The simplest thing in the world," says the salesman, picking up a piece of wire and looking around; "Is this a lightning rod—passing the window here? Yes? All right. Now, you see

this square of wires on this stick? All right. Now suppose somebody's broadcasting something at Longhorn City. They have a machine there to turn his voice into ether waves; and the ether waves fly through the air until they hit this square of wires, in which they become entangled. Then—"

"What are the lights for?" I asked him.

"Why—er—," says he. "Say, you've seen moths around a kerosene lamp, haven't you? Well, these ether waves are exactly like i n v i s i b l e moths. Once you've got them caught in the wires, you show them these lights, and they fly towards them through these holes in the panel—"

"Well, what's the mosquito netting over the holes for?"

"Er—that," says the salesman, "is—er—to prevent them getting out again, once they're in. Their only way out, once they're inside, is through these telephone receivers. And so you hear all that's going on. Anything you don't want to hear, you just turn these dials, and you hear something else. You see these numbers? Well, they're like football signals. For instance, if you're set 45—23—56—79, and you're getting a bed-time story, you just change to 34—77—82—22—and you're in the middle of a prize fight."

"It sounds simple," says I.

"And it is simple," says the salesman, watching me fumble in my hip pocket, where I always carry reward-money, so I can sit on it, "with the quadruple neutrosaurus."

"The only thing is," I remarked, "that I'd like to hear something further away than Longhorn City. In fact, the further the better."

You know, there was a look in his eye, at that moment, that almost made me suspect, weak as I was, that he'd heard something about my local unpopularity; but it didn't last long enough for me to classify and label it properly.

"That's the simplest thing in the world," says he. "You need a bigger dead-fall to catch the ether-waves in, that's all."

"Ah!" says I, starting to shove my money back into my pocket.

"One moment!" says the salesman. "It will cost you nothing extra. Haven't you got a whole nest of telegraph lines running right by the house?"

"Telephone."

"Same thing," says the guy. "You can use them for a spider's web—they extend half across the State.. All you have to do is to take this wire—"he started unwinding the wire off the small spider's web which was standing on the table—"and tie a weight to the

"Well," says the individual, shifting a plug of tobacco from one cheek to the other—

end of it—" he picked up an ore-sample, and used that— "and lean out of the window, like this, and throw it over the telephone lines, so you'll have no difficulty whatever in picking up KDKA—"

"Where's that?" I asked.

"San Francisco," says the salesman. "Now just put the head-set over your ears, and start turning those dials."

Just as he said that, all the electric lights in the box gave a kind of final blaze and turned black. I called his attention to it.

"Er—that's all right," he says. "It's just that so many ether waves have been attracted, with this big aerial—aerial, that's what we call it—that they're all over the lights, and—"

"Well," says I, having put on the headset. "I can't hear anything."

"You haven't got the dials set right," snaps the salesman, who had seemed, for some time, to be getting extremely restive, considering the circumstances. "Now, twiddle this one all the way around. Just try the various combinations, and you'll get something."

"Where are you going?" I demanded, taking off the telephone receivers as he made a motion to pick up his hat.

"Why, I'll tell you," says he. "It's our invariable rule, with the post-mortem selective honeycomb machine, to let the client sell it to himself. We don't give him any—er—selling talk. We just simply leave it with him, and call back for his answer. I've just — er — remembered that I promised to drop in on somebody else I left a machine with. I'm late now. I'll be back tomorrow, to see what you think."

"Well," says I, "all right, but—"

There was kind of a doubt, even in my lead-poisoned mind, at the moment—kind of a feeling that this remark contradicted something the young man had said before; which of course was right, he having given me to understand that this was the first machine to be seen in Gold Creek, which was why I was getting it so cheap. Before I could wrap my intellect a r o u n d this thought, however, he was gone, with a promise to be back first thing in the morning.

"Sure?" I asked pathetically, his human society being what I craved even more than his bargain in radio machines.

"Well, anyhow," he assured me, standing in the doorway, and grinning in a more or less peculiar manner which I attributed to the lamp-light. "If anything prevents me from getting here first thing myself, you'll hear from me. Good night."

And he was gone, leaving me lonelier even than I had been before his arrival, not to mention considerably weaker. What with the excitement, and the moving around to get a good look at the radio machine, I was feeling tired out, and all my eight bullet wounds were aching pretty severely. So I made one last effort, shifted my chair where I could work the dials

without getting my hand too far out of the blankets, put the telephone receivers on my ears, and kind of lay back with my eyes closed, waiting to hear something. Every once in a while, I would give one of the dials a twiddle —seemingly without results; not that I cared very much, feeling more inclined to go to sleep than anything else. Probably I should have dozed off, right there with the headpiece on, if, all of a sudden, I hadn't heard a kind of growling noise in the receivers, and then distinctly made out a human voice saying "Hello! Hello! Hello! Willie?"

A bass voice growled back "Yeah—is that you Bronson?" but I didn't pay much attention to it. What startled me was that the first voice, unless I was very much mistaken, was that of my friend the salesman. There was a loud noise of crackling and popping in the phone, to say nothing of sounds like snakes hissing, and an occasional shriek; but when he spoke again, I was certain of the identification. And it wasn't so much the way he spoke, as what he said.

"Well, I worked it on the pop-pop-pop-ssssss-meaouw fool," says this respectful young man. "He grrrrrr-pop-pop bargain, and now sssssssss sitting there waiting to hear uggle-uggle-uggle-crack-crack and Kansas City. Funny thing was, I could see a letter from that Stony Spring jasper we pop-pop-pop-last night, lying right there on his table, starting off 'Pokeson, you fool, you' and going on to describe this radio we hooked. I had to laugh. He hadn't read it, evidently."

"Where are you now?" demands the bass voice through a sort of bombardment.

"I'm in the Gold Creek drug store, right across the grrrrftz from his office," says the salesman. "I can look in through the window and psssst grrraouw him sitting there twiddling the pop-pop-pop get Kansas City. Ha, ha, ha, psssst!"

"Well, that's enough about that pop ting ting," says the bass voice. "Waste of boom boom bumble anyhow. Now listen—"

"Oh, bumble," says the salesman. "We're operatin' in somebody else's terrijangle hiss, and if they wanted his discredit crackle crackle, it was the least we could hum-m-m. He'll be discredited all right when they find that machine all busted in his office tom-hiss-hiss-hiss."

"Say, what's the matter with this telephone?" demanded the bass voice. "I can't fizzzzzwhiffle you say. No! Don't meaouw pfft all over again. I'm at the Circle S aouwaouw and you'd better get your grrrrrrpop and join me there."

"Psssssst o. k.? Old guy got the monjing jing?"

"All jingle wank wank. Hurry up."

I respectfully ask the reader if he expects me to describe my state of mind at this? Because if he does, he is going to be severely disappointed. I wouldn't attempt such a task even if I was feeling well; and for reasons which will appear, I am at this moment feeling rather worse physically—though in a better state of mind—than I was then. All I can do, to fill in the interval which elapsed between my hearing that telephone conversation, and staggering out to the stable to get my horse—is to say that those articles about the life-saving value of the radio for sick sailors at sea, are true and then some I doubt if Doc Brewer, with all his hypodermic syringes and his prescriptions of spiritus frumenti, which is whiskey when prescribed by a doctor, could have given me the sud-

F. R. Buckley has been an editor, scenario writer, actor, newspaperman, and last but certainly not least, a real radio fan—beginning in the days when the old coherers were still abroad in the land. His principal stories were the "Bill Garfield" series, running for three years in Western Story Magazine, "Gold Mounted Guns," which won the O'Henry Memorial Prize in 1922, and "Habit," which was honorably mentioned in the O'Henry Memorial Volume for 1923.

You'll like "Per Land Line," and you'll like the story for November, written by another of our leading authors. Our best authors are writing for "The Wireless Age." More, they are writing their best.

den burst of strength which was conferred on me by that radio machine, busted as it was. For the time being, I was full of health and liveliness; and my wounds didn't even itch. You can tell that the cure was rather unusual, when I remark that with one .45 calibre bullet in my left knee, and another just under the skin on the inside of my right calf, I vaulted on to my pony's back without touching the stirrup and started out of town at a gallop. I hadn't needed to pause for my weapons, because I had been wearing a revolver in a shoulder-holster all the time. Doc Brewer had thought better to leave it on when he was fixing me up after the train-robber episode; one of its buckles having been driven into my person pretty deeply by a pullet that had hit me in the shoulder.

Of course, Brewer contends that my ride to the Circle S and my subsequent proceedings, were not due to radio at all; that I was simply in a mixed condition of rage and delirium, and that I was probably unconscious during most of the gallop across the prairie. However, while I admit I didn't pay much attention to the scenery, and am unable, at this moment, to state whether there was a moon or not—it's a positive fact that I spent the whole time thinking the most complicated thoughts; and if I rode through Prairie Dog, which is six miles out of the way, as it is alleged I did with my bandages streaming out behind me—why, I was probably taking a little more time for the figuring out of my problems.

You see, it was pretty near the time when I was due to come up for re-election as town marshal; and to make the election a cinch, it was desirable that I should have both the rich folks and the bums on my side, instead of against me as at present. And it seemed to me, the way I had figured out, that this business, properly managed, would turn the situation around, just as I wanted it turned. I could please the rich folks by arresting the burglars that'd been worrying them so much; while at the same time not offending the criminal classes (who have votes, you know)—by seeming to arrest another of their number.

I got this clear in my own mind, whatever may be the conditions of the reader's—just as I arrived at the piazza of the Circle S ranch-house, where old man Stevens lives alone, his punchers being housed a quarter of a mile away, so that they won't be able to look in through the windows while the boss counts the money he is alleged to hoard.

Just as I dismounted, a jasper—the jasper with the bass telephone voice, judging by the tone of his "Ouch!" when I hit him—came up and endeavored to stick a gun-muzzle against my ribs; and was, naturally, knocked out by the application of my left boot to the point of his jaw. I had no business with him, anyhow. What I wanted was a chat with the alleged radio salesman, whom I could see through the open front door of the ranch-house, to be sitting on old Man Steven's chest, as the owner of the Circle S lay in bed, waving a revolver two inches in front of his prospect's nose, and inviting him (a) to tell where his money was concealed or (b) to have his head blown off.

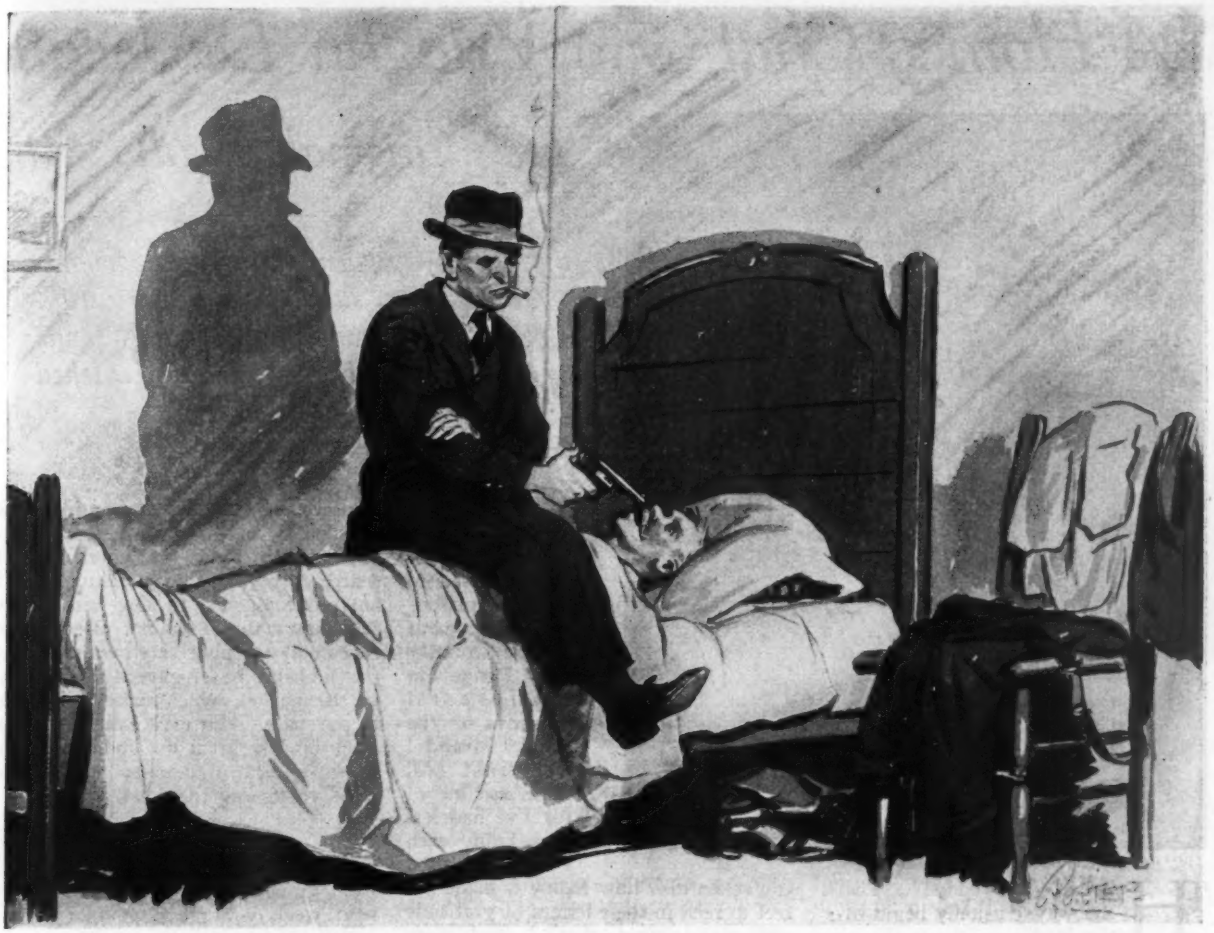
"No, no, nooooo!" chatters Stevens —who, when himself, controls a whole lot of municipal votes.

"Yes, yes, yes," says the sub-neuter-heterodox expert, massaging the old man's nose with the gun-barrel. "I'm going to count three, and after that, I might count up to a million without your hearing me. One."

"I'm a poor man, I——"

"Two!"

"I haven't got any money. I swear I haven't! It's all in the First National——"



"Yes, yes, yes," says the sub-neuter-heterodox expert, massaging the old man's nose with the gun barrel

"Thr——"

"——box under the kitchen floor," sobs old man Stevens.

By this time, having conducted my transaction with the bass-voiced jasper in complete silence, without even a bit of static to give the alarm, I was standing just outside the ranch-house door. I now stepped in.

"But before you attend to that," I said to the salesman, who had risen hastily and turned toward the back of the house. "I should like to——"

Well, ladies, gents, and readers all, will you believe that at those polite, gentlemanly and business-like words, the man turned around and fired a revolver plumb at me? More than that—if I had kept my head in the place I had it when I spoke, he'd have killed me; the bullet hummed over my head, stooping though I was. And it wasn't any accident on his part, either; for at the moment I dropped my own gun and leaped upon him, he was actually fixing to take better aim and fire again.

I mean, the cold-blooded ingratitude of it—a good customer like me! I did *not* sink my teeth into the man's left cheek, as has been alleged; but I'm open to admit that a little resentment may have crept into the manner with which I hammered his head against the sharp corner of Steven's bedstead; though to say I did this so violently as to shake the old miser out on to the floor, is, of course, absurd. We weren't near the bedstead for more than a minute; at the end of which time the salesman gave a kind of desperate waggle with his legs, and tossed us both over to the other side of the room, where we landed under the legs of the stove. Naturally, Doc Brewer knows more about the man's injuries than I do; but all I can say is that, whatever the shape of his bruises, I do not remember using the stove poker with the octagonal knob, or any other part of the stove except the lid, which happened to stick to the palm of my right hand just as I went to slap the salesman's face. The idea of this slap was more or less to restore him from a fainting-spell which had seemed to be coming on him ever since I accidentally knelt on his solar plexus; and I must say, in my own defense, that in spite of the stove-lid, it seemed to have the desired effect. The man woke up to the extent of trying to stick both his thumbs in my eyes; and it was at this point that the only semblance of biting took place—he got them in my mouth by mistake; probably being slightly dizzy from the pressure of my hands on his throat. Well, that was about all. I saw that there was no reasoning with the fellow, and so I tore myself loose and stood up, and when he followed my example, I picked up a chair—the very best chair in the room, a handsome affair with carved mahogany pineapples all over it—and knocked him down.

"My preserver!" says old man Stevens, who reads all the sentimental stories he can get given to him for nothing.

"Preserver nothing!" says I, thus causing him to draw back in alarm and later to back up Doc Brewer's opinion that I was delirious; which, of course, I wasn't, being engaged up to the moment of falling unconscious, in carrying out a perfectly logical plan; the fruits of which became visible next evening—when a delegation of our most eminent and uncaught local ruf-

(*Turn to page* 86)

"A Homey Chat" with Vaughn De Leath

The Original Radio Girl

"Leathy" certainly can radiate friendliness when she has the opportunity. She'll have some more good friends on her list when you have finished reading this

"HELLO Everybody!" That's the way I usually begin over the Radio, so that's the way I'll commence this chat, although it's lots more fun and easier for me to say this through the "mike."

I've had plenty of interesting experiences through Radio, believe me! For no Follies beauty ever had more "stage Johnnies" persuing her and notes rolling in than I've had through Radio. Remember I say this in all modesty! for I'm bound to admit that no one would have been killed in the rush if, instead of singing, the competition had been a beauty contest! But when it comes to that tricky voice of mine, that goes trundling out over the air to all parts of the world and to all kinds of people, there's something in those old pipes that opens up a flood of understanding and appreciation from the listeners! And believe me I'm glad! "Gladder" than mere words can tell you, for it certainly is gratifying to pour out all the love for humanity that I possess into the "tin plate" and then find that many who have listened have received my message in the same spirit in which I sent it.

Bringing light to the blind! Amusement to the disheartened! Entertainment to the sick! Music to the deaf! (For they do hear through Radio, you know). Rest to the weary! Hope to the discouraged! Cheer to the friendless! A bit of the world to walled-in prisoners! Enjoyment to the country folk! Rangers in the forests! Cowboys on the plains! Invalids! Shut-ins! All these and more! for I've had letters from each variety and you've no idea how happy it made me feel to read in their letters of gratitude and appreciation that I had been allowed to bring a bit of joy to them!

One day in Philadelphia, soon after my broadcast at WDAR, I went to the telegraph office to send a wire. While writing it, I inquired the rate to N——. The girl in attendance looked up quickly, smiled, and pleasantly gave the information desired. I handed her my wire and was surprised to hear her say "Bless your heart, honey. I recognized your voice but waited to see your signature before I spoke. We heard you sing last night and all just loved you to pieces." That was a happy experience!

One night when testing on 2XAX (midnight) I took the microphone without being announced (that was before I was connected with the station) and the phone calls came pouring in from all over the country. I thought few people would be listening so late, but it seemed like everyone must have been DX fishing that night, and without exception all had some message for the Radio Girl.

Even taxi drivers have recognized my voice when giving an address. But I never noticed that the meter registered any less!

Perhaps one of the closest associations with my Radio experience is "Susan." Susan has developed a real personality and seems to be such a favorite with radio audiences that I scarcely appear from a station that I am not compelled to sing her. Most fans know that I do not offer Susan repeatedly to "plug" my own song, for the publisher never gave it a fair show on the market, which makes it difficult to purchase. However, when requests stack up I feel that my audience really wants to hear it, and so it gives me pleasure to sing the song of their desire.

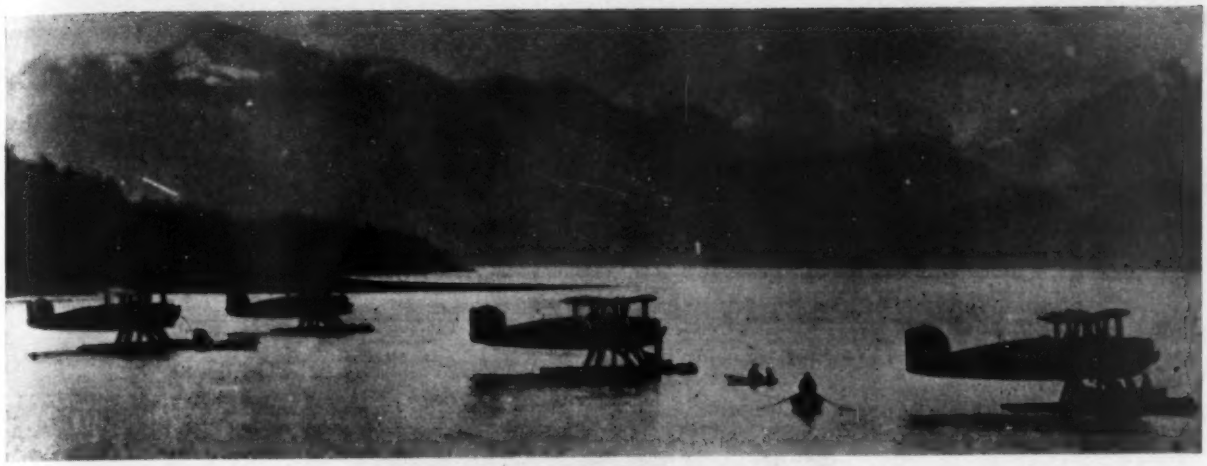
So it is with all my selections. I'd like to respond to every request, but if I did I'd be working into the middle of next week without stopping. Consequently I've adopted a rule to sing those selections which receive the largest number of requests.

Artists come and go. So when an engagement in Belasco's "Laugh, Clown, Laugh" was accepted, realizing that I could not broadcast so frequently, I was a bit apprehensive lest the fans forget their Radio Girl. Joy! When I returned I found that they were still in tune with me and loyal besides. For when some other "gal" tried to "steal my stuff" and announced herself as the Radio Girl, the fans put up such a howl that I was not long in finding it out. So it is that Vaughn De Leath still retains the title of the "Original Radio Girl."

The old hams will remember that I broadcast entertainment before there were such things as broadcasting stations. For I was sending songs and sayings out over the air before there were any microphones. A big horn (like those used on the old style phonographs) served in this capacity, and the tower from which we made our tests was so small that it wouldn't hold a piano.

It was the success of these experiments and the ready acceptance of my programs by wireless enthusiasts that

(*Turn to page* 88)



The Radio Story of the World Flight

As told by

Ensign Lee H. Baker, Radio Officer, U. S. Coast Guard Cutter "Haida" to Admiral F. C. Billard
Commandant of the Coast Guard

A MODERN Homer can write an epic, an aero and radio odyssey, recording the experiences of the U. S. Army World Cruise Flight of four aeroplanes that started to circumnavigate the earth on March 17, 1924, and of the Coast Guard cutters, the *Haida* and *Algonquin*, in maintaining a ship and radio patrol in the sub-Arctic regions of the North Pacific while the aviators were making the first trans-Pacific flight. The experiences of the U. S. Navy cruisers and destroyers in the ice-infested regions of the North Atlantic, while the aviators were making the first westward crossing of the Atlantic by aeroplane exceed anything that Jules Verne wrote.

Additional adventure element was added by the plucky efforts of the British, French, Italian, Portuguese and Argentinians who started in world flights without preparation and were promptly adopted by the Americans interested in the world flight, who prepared to aid in every way possible.

The casualties, entirely to machines, were divided equally: Major Frederick L. Martin, U. S. A., and Major Stuart MacLaren, British, lost their planes in the North Pacific; Lieutenant Leigh Wade and Antonio Locatelli lost theirs in the North Atlantic; Lieutenant Peltier D'Oisy, French, and Captains Sermiento de Beires and Brito Paia, Portuguese, lost theirs in Asia, after making notable flights; the last two were actually flying only from Lisbon to Macao, but as they were reported as making the world flight the American organizations stood ready to aid them.

The honor of completing the world flight was won by Lieutenant Lowell H. Smith and Lieutenant Eric Nelson, accompanied respectively by Lieutenant John Harding, Jr., and Lieutenant Leslie P. Arnold.

An Army officer, in close contact with the flight, has stated that one of the greatest lessons of the flight has been learned about communication. If the Pacific is to be crossed as a regular business it is essential that better communication be established along the Aleutian Islands. Between Dutch Harbor Naval Radio Station and Japan there is not a single radio station.

Radio was imperative and vital to the success of the flight. There were three principal reasons:

First, the planes were hopping from three to seven hundred miles on each jump. It was necessary to know the weather conditions along the line of flight. These conditions had to be known early in the morning so that the flight could start as soon as possible.

Second, if one plane fell during a hop the other planes were to proceed to the nearest radio station and drop a note telling about the accident. This made it possible to send assistance within a very short time.

Third, publicity. The flight would be of little value if the people of the United States were not informed of its progress. This news was wanted at once by all the various news organizations of the country. Radio was the means of getting the news out.

These three reasons caused the radio work in connection with the World Flight to assume extraordinary proportions. Most of the radio work through the Aleutian Islands was done by the Coast Guard Cutter *Haida*. The traffic reached its height between April 18 and May 18.

April 18, found the *Haida* at Unalaska. Three of the planes were at Chignik. Major Martin had gone down at Kanatak while en route from Seward to Chignik. The *Algonquin* was assisting him. The other planes were expected to proceed to Unalaska the first favorable weather.

Lieutenant Clayton Bissell, Army Air Service, Advance Officer for the first division of the flight, and Major W. E. Blair, Army Signal Corps,

Photograph (top of page) of the World Flight cruisers equipped with pontoons at Sitka Bay, Alaska

Steamship plowing through ice floes is a typical scene on the Alaska course of the World Flight

(Left) "Forced feeding," illustrating some of the hazards on the World Flight (Middle) Flight Commander Lieutenant Lowell Smith bidding his mother goodbye (Lower) Mrs. J. Koenig christening Lieutenant Eric Nelson's air cruiser. Lieut. Nelson and Lieut. Lowell Smith were the heroes of the World Flight

weather observer for the flight, were on board the *Haida*. These two officers had frequent messages to send. The expected news of the flight kept the ship strictly on edge as far as receiving was concerned.

On several occasions permission was secured from the Dutch Harbor Naval Radio Station and the *Haida* opened up on the two kilowatt arc and sent press direct to Estavan Radio Station on Vancouver Island, British Columbia (VAB). Inasmuch as the vessel was moored in a landlocked harbor the results at sixteen hundred miles were pleasing.

Three planes hopped off from Chignik for Unalaska on April 19. Arrangements made by the Army Air Service Advance Officer were excellent. Each cannery station on the route sent notice to Dutch Harbor, giving the time that the planes passed over. The *Haida* listened in and was able to give each report to the Advance Officer before he received the word from the Naval Radio Station.

When the three planes reached Unalaska plans were discussed for the work to the westward. The hops west of Unalaska were from Unalaska to Atka, from Atka to Attu, and from Attu to the Kuril Islands. The *Haida, Algonquin* and Bureau of Fisheries Tender *Eider* were to be used along the hops. Two destroyers, the *Ford* and *Pope*, were stationed at the Kuril Islands, but could not leave their assigned positions.

The section through the Aleutians represented the hardest part of the World Flight. Distances were carefully calculated. The cruising radius of the planes and assisting vessels was considered. The radio equipment of the vessels was estimated. Definite stations were assigned for each hop. The details were largely worked out by the Advance Officer, who submitted them to the Radio Department of the *Haida* for suggestions. One of the suggestions was to let the Coast Guard operators do the entire work. The Air Service had secured permission for naval operators to be used wherever needed. They were especially to be used at the shore station. We believed our operators could handle the work and secured permission to go ahead. This permission placed the final word on making the shore station a Coast Guard station in every respect. A splendid system of relaying reports was organized. Plans were perfected for a search in case one of the planes should go down. The whole thing was well done and it would have been interesting to have seen it placed in operation. The complete plan was never used.

The accident to Major Martin's plane upset all calculations. With the assistance of the *Algonquin* he had succeeded in reaching Chignik. He attempted the hop from Chignik to Unalaska. Arrangements for the same cannery reports had been made. The only report received was from Chignik, telling that he had left. For hours the *Haida* and Dutch Harbor listen in for news. The other points had not seen the plane. This meant that he had not passed the first reporting station, King Cove. The plane must have fallen between Chignik and King Cove.

The *Algonquin* was in that vicinity and at once started a search, calling for assistance from the cannery vessels nearby. The *Haida*, carrying the Advance Officer, left Unalaska to assist in the search. Major Blair was left at Unalaska.

For three days the heaviest radio traffic poured in and out of the *Haida*. False reports and reports containing no news, directions, orders, and suggestions for a better search. And through the whole work the inevitable press dispatches had to be sent out nightly to Estavan. The world was interested and dependent on Coast Guard cutters for news. The *Haida* on this press work used her half-kilowatt spark set and successfully worked Estavan at a distance of fifteen hundred miles.

With the search progressing slowly and no news to point to the safety of the plane and its occupants, the three planes at Unalaska decided to continue their flight. The *Haida* with Major Blair proceeded to Atka. The planes hopped off and made Atka. The *Eider* proceeded to Attu. The *Haida* was withdrawn from the search and went to Atka. The *Algonquin* remained at Chignik to continue the search.

The radio equipment of the *Haida* is the same as when she was originally commissioned. The main transmitting set consists of a two-kilowatt arc. The arc has proved extremely satisfactory on high wave lengths. When used with the chopper on low wave lengths results have not been noteworthy. This type of set for a cruising cutter on Coast Guard duty is not desirable, in-

asmuch as most of the messages sent are of few words. For the flight work, especially press, the set came through splendidly.

The auxiliary transmitting set is a half-kilowatt spark. We secure ten amperes radiation on this set. The spark set has been used as the main transmitting set practically ever since the vessel has been in commission due to difficulties with the arc on the lower wave lengths.

The radio telephone is a Western Electric transmitter-receiver type CW-936A with a Western Electric amplifier type CW-926A.

The main receiver of the *Haida* is a BuCS-1420C model and the amplifier is a 1008 BuSE model. The antenna is largely responsible for the results on the flight work. The aerial is as originally installed. Insulation had been carefully watched. The trouble usually arising from leakage at the lead-in insulator when the arc is in use was eliminated by giving the insulator an occasional paraffine bath.

The *Eider* has a half-kilowatt spark transmitting set. Her radiation is about four amperes and her transmitting radius is stretched when she sends four hundred miles. She can transmit only on five hundred kilocycles. Her Captain would not permit the *Haida* to endeavor to tune the set to a different frequency. We could have done so by using our receiver as a wave meter in the absence of a regular wave meter.

The receiver of the *Eider* is an old type Navy set. Her aerial defies description. It is as unique as it is inefficient. It runs through stays and around masts. The insulation is leaky. For power the *Eider* has one set of storage batteries. They must be constantly on charge when the ship is not transmitting. She carries one radio operator, a Chinaman, of limited abilities. Her engineer officer takes a watch at times when he is off duty. What the vessel accomplished in connection with the flight radio work is greatly to the credit of her Captain, who is cognizant of the limitations of the ship's apparatus.

A Voice From the Air

By Harriet M. Cushing

Out of the ether it comes to us all,
Mellow, and vibrant and clear
Bringing the suff'rer, the lonely, the sad
Refreshment, and courage and cheer.

It seems like the hand-clasp of buddies he's had
To the soldier on hospital bed,
And the Golden Star Mother hears tones that she loved
In the voice of her own soldier dead.

The friendless one feels that it brings him a friend,
The crook that it pays to be true,
While millions are waiting, and eager and glad
To hear it, like me and like you.

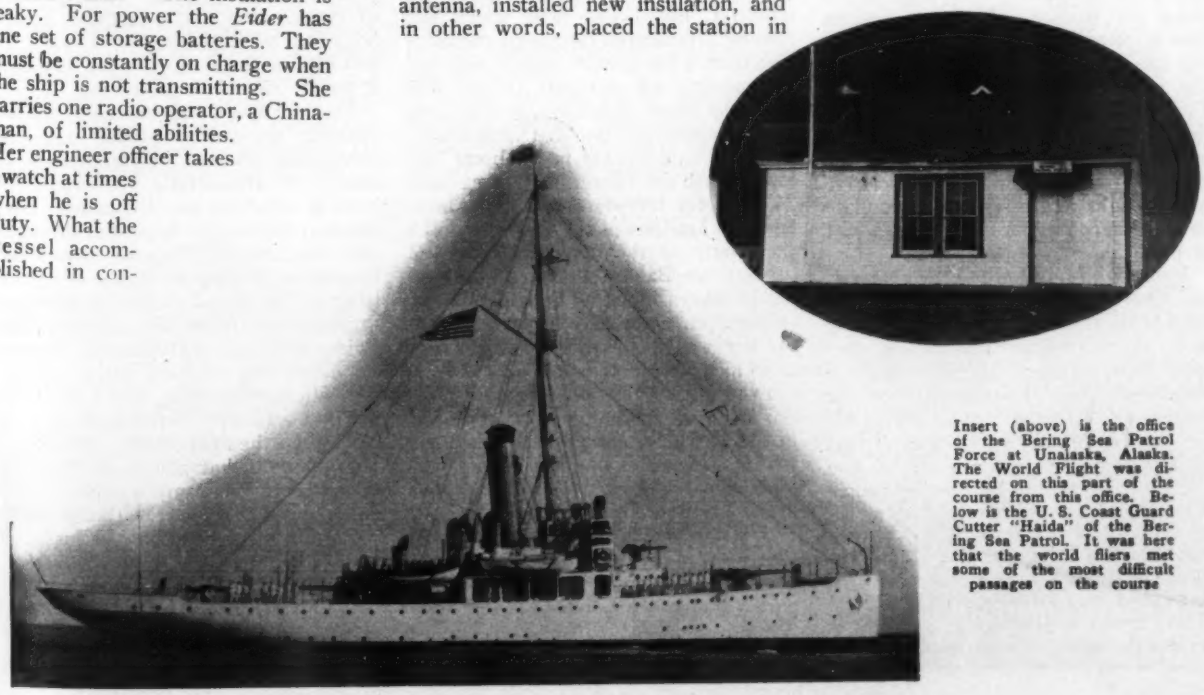
The third set in use to the westward was the shore station at Atka. When the *Haida* reached Atka we found an old radio set which the *Algonquin* installed some years ago for the Bureau of Education. The set was more or less of a wreck. The Edison batteries had been exposed and almost ruined. The power plant was a hopeless wreck, due to the fact that some enterprising native had used it as a chicken coop. Water had leaked in and damaged the receiver. The antenna was being used by the Aleuts as a rack for drying fish and as a clothesline.

The *Haida* charged and cleaned the batteries, sent a spark coil ashore for use as a transmitter, fixed up the receiver, cleared fish and clothes off the antenna, installed new insulation, and in other words, placed the station in operation. For an operator we used one of the school teachers who knew Morse Continental code and all messages between th *Haida* and the shore station were sent in that code.

The shore station at Attu was a matter of pride with the *Haida*. Early in March the ship started to find out about the establishment of a shore station. Such a station would be valuable in that it would eliminate the necessity for one of the assisting vessels remaining at Attu until the flight should leave. The ships could be well out along the course of the flight and the shore station could give notice when the planes hopped off. Matters were slow in progressing and action in favor of the station was not taken until the afternoon before the *Haida* sailed from Seattle. The Signal Corps had no portable sets at Seattle. The Air Service then gave the ship permission to purchase the parts and power for a shore station capable of sending and receiving messages at a distance of two hundred miles. We decided on a twenty-watt tube set. We did succeed in securing a Signal Corps receiver and amplifier of very good quality.

The transmitting set was built by the *Haida* en route north. It consisted of four five-watt tubes in parallel. For an antenna we constructed a squirrel cage, six-wire, about sixty feet long. We figured in case of necessity that we had enough battery power to maintain the station continuously for forty-eight hours. We used thirty-six hours as the safety margin. We found that with the available power we secured best results using two tubes, rather than

(*Turn to page* 74)



Insert (above) is the office of the Bering Sea Patrol Force at Unalaska, Alaska. The World Flight was directed on this part of the course from this office. Below is the U. S. Coast Guard Cutter "Haida" of the Bering Sea Patrol. It was here that the world fliers met some of the most difficult passages on the course

WOMEN— POLITICS— and RADIO

The intelligent woman is doing some thinking about politics, and radio is giving her the information she wants for right thinking.

The housewife demands political action—no thrill for her in flowery orations.

By CHRISTINE FREDERICK

ARE women interested in politics? Wise-acres have said *no*. This was doubtless true—prior to the two great recent national conventions! But I very seriously doubt whether any such accusation can be made today, for the simple reason that the political conventions were brought into women's homes, and politics became family discussion in a manner not heretofore known.

I believe that women have not been interested in politics in the past because political meetings have been too much like lodge smokers—with little or no place for women. No man realizes how a woman feels in a railway smoking car, where men squat and regard the place as intrinsically their own. That has been precisely what women have felt about politics, even since women have had the vote, for even the leaders of the woman movement have had to fight aggressively for a place on political committees, and to be a part of political "pow-wows."

Radio with one fell swoop, however, has made it possible in every home to hear politics, to catch the infection and to be thrown wholly into the political spirit in a manner such as men have experienced and been a part of for centuries. After all, politics is like baseball or football; you can't get greatly enthused over a game, if you are a novice, simply by hearing people talk about it or by just reading newspapers. *You must see and hear the game played.* That is precisely what women have *not* done heretofore with regard to politics. They have not attended ward meetings, street corner harangues, or conventions. They have not heard the game played and have, therefore, never become stirred by the competitive spirit or moved by the mass appeal of personality as the voter encounters it in political gatherings.

I will never forget the Democratic Convention, to which I listened entirely by radio; just as I will never forget some other great gatherings which I personally visited. It was entirely a new sensation to me. I am not at all a politically-minded woman (in which I am like nine-tenths of all women), but I can now watch the coming presidential campaign and election with a far greater insight and understanding of national issues, and with far more zest than would have been possible had not that little blackmouthed loud-speaker in my home bellowed forth the famous "Alabama casts 24 votes for Underwood," or the lumbersome orations of the Boy Orator of the Platte or the impassioned appeal of Newton Baker—to say nothing of the gavel-crashings of Senator Walsh, or the amazing medley of sound representing a radio interpretation of long-continued applause.

From the family point of view, politics has always been more or less taboo in the average household. Politics has usually meant, to the housewife, endless male bickerings over the dinner table on controversial subjects, of which the women of the family knew or cared little. As a rule, husband was the oracle who laid down his ideas of party and politics, which the family invariably adopted meekly as its own; or, if the younger generation was old enough, would vehemently dispute on their slender information—mostly because of its possibilities for debate and excitement. After all, politics is more lively and has more "kick" for the snappy younger generation than the much advertised hip-flask which is credited to the younger generation!

In my own household, the first days of the convention were listened to with the interest of pure novelty, followed by a reaction of boredom by the younger set; then by a curious renewal of interest due to the fact that everybody was talking about it. The matter had become the subject of the moment; it simply *had* to be talked out.

Unconsciously and inevitably an increasing amount of tuning in to the convention resulted. I frankly believe that if the Democratic convention had been as short as the Republican convention, the interest in politics throughout the country this year would not have been as great as it now is certain to be. The very fact that it was long drawn out, torturous, boresome at times, and full of dramatic tension, served to stage it as a great national dramatic performance, which somehow had to be listened through, if only to be "in" on the final climax. Wherever I go I find that the same situation which prevailed in my household, was experienced elsewhere. Radio listeners-in to the convention discussed it with each other when they met socially. They compared notes on whether Bryan was losing his grip on oratory;

on what they thought of the Ku Klux Klan; on the fine quality of Baker's address; on the stupidity of political conventions generally.

In other words, without seeming to realize it, *women were talking politics,* whereas had it not been for radio, they would have talked children, housekeeping or fashions when they got together.

It seems to me, therefore, that a greater appetite for politics has been absorbed by women through the convention radio broadcasting, much in the same unconscious manner that they are now teaching radio telegraphy in the Naval School, by putting ear-pieces on student operators while they sleep, thus educating their subconscious mind. It is my contention that possibly millions of women have been taught the beginnings of interest in politics in a more or less subconscious manner, via radio, during political conventions.

We all know that that a definite characteristic of woman-kind is that of a strongly *personalized* interest. Woman does not learn readily via the abstract or via the printed word. She learns best by ear, by eye and by personal word of mouth. She has now had a more personal contact with politics, and I think it is the beginning of a greatly desired new era of women in American politics.

It has been a great disappointment to the leaders of women suffrage that women have not heightened their interest in the vote as had been hoped when the franchise was won. But these women have hoped too much, for it is well known that the percentage of all those who vote has declined alarmingly in recent generations—among men especially; and no factor has been present to make the percentage of women exercising the vote greater than the percentage of men. Perhaps we can look for not only a stimulation of politics by women, but also a stimulation toward voting by men, through the effects of political radio-broadcasting.

What will be women's reaction to political speeches over the radio in the coming campaign? Already the answer is forecast in the attitude of the radio broadcasting managers, who have formally hinted to the politicians that fifteen minutes must be the maximum length of political speeches over the radio. Talk being women's own pet specialty, it is to be expected that women would be impatient with the endless long drawn out verbiage of political speakers, which, apparently, male voters have stood for all these centuries! Women have a more practical sense than men, and so far as I can

Mrs. Christine Frederick has been consulting Household Editor for the "Ladies' Home Journal," Household Editor for "Designer," contributor to "Farm and Home," "Modern Priscilla" and many other publications for women. She has packed the best of this experience into "Women, Politics and Radio." You'll feel her enthusiasm in every paragraph

observe, they are not as readily moveable as a mass by political buncombe as are men. They always keep their desired objectives fairly well in view. If they want child labor legislation, they are not so easily bamboozled by "Senator Sounder" and his mellifluous ambiguities. They want to know: *"When do we legislate?"*

Another important aspect of radio in politics is the fact that women are "the stay-at-home sex." It is far more likely that the family radio outfit will be operated more nights of the week by a woman than by a man. Whatever may be the reasons for father's staying out, women are invariably on the job in the home during more broadcasting hours than men.

If the political radio orators can, therefore, devise their appeals to interest women, they have a greater chance to influence women's votes than men; for, after all, women being new in politics, they are slightly less bound to the wheels of party tradition than men, and will appraise the speakers with less political bias. A woman's interest in politics is, I should say, confined mainly to close-to-home issues and Presidents! From the time of the formation of the republic, women have had a romantic and emotional interest in the Presidency, if for no other reason than that they proverbially dream of their sons occupying the White House. A presidential year is, therefore, distinctly a year for women in politics, and I will miss my guess if the ballots cast by women in November does not immensely exceed any registration of women voters ever before known in the country. I will not be amazed to learn that more women will have voted than men!

Something significant and stimulating has also been done for boys and girls in bringing politics closer to the home. We are told today that the most important habits of life are fixed far earlier in life than we have hitherto understood. The almost constant absence of father in the modern home has destroyed that continuous family conversation, which now is much contracted by life in large cities and the demands of modern high speed business. Nor, in fact, does the younger generation sit at the feet of father in the same old sense! It likes to absorb information independently!

The younger gereration makes its own contacts, gets its own ideas; and naturally a new means of enlarging its horizon in its own affairs is a matter of deep public significance. While I certainly have no illusions as to the number of youngsters who tune in on political speeches—knowing well the frequent tuning out of everything but jazz—yet even in the light and careless way which youngsters have, they seem to have gotten something out of the

(*Turn to page 76*)

When politics enter the home there is a refining influence to be dealt with and a standard to be met—the women of the home demand it

The D-Coil Again!

Letters from Wireless Age Readers Relate Remarkable Results Obtained With It

Some Refinements in Design — Construction Hints and Operating Helps

Readers Enthuse in Their Comments About It

By R. A. BRADLEY

DID you see the D-coil receiver in the June Wireless Age? You did? And did you build one like it for yourself? You did? Well, that's funny—so did many of our readers and what's more, we built a very fine one, adding a few refinements and developments and here it is. A two-control, two-stage tuned radio frequency receiver which you can build and which you will enjoy and which you will be proud of owning.

Not only will we discuss the new developments in the circuit, but we will also try to clear up the obscure points in the previous article. These are taken from your letters so they will in all probability set you right.

We have received hundreds and hundreds of letters on the D-coil receiver; letters of real enthusiasm, letters of satisfaction—some pronounced it the best receiver developed so far—and letters from those who needed just a hint or bit of help in construction. Because of these letters we know that we have given Wireless Age readers another good set.

You will remember that in the original article Mr. MacIlvain said that this receiver when properly constructed would give remarkably clear reception.

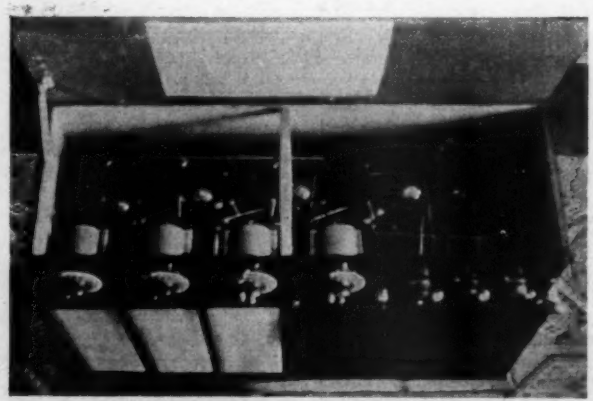
Mr. John G. Winston, of Richmond, Va., reports that "on a cloudy hot evening I was able to bring in KDKA, WJZ and WGY and WBZ beautifully clear on the detector." So you see, it fulfills those claims and we did not overestimate its good features.

Because of the construction of the D-coils and their relation to each other, we said that the set would not oscillate and would prove perfectly stable. Most of you who had trouble in this instance can lay the blame on the way you placed the D-coils. Note the illustrations on how they are placed. Mr. E. F. Stearns of Lake George, N. Y., had his D-coils placed wrong at first. After changing them to the correct position he wrote us. "There has not been one whistle since I made the change. The whole set percolates in the most delightful fashion. It's the best receiver I ever heard and the whole family enjoys it immensely, thanks to The Wireless Age."

LIST OF MATERIALS FOR THE "D" COIL RECEIVER

- One 7x26 hard rubber panel
- One Carter jack switch
- Five Na-Ald standard sockets
- One .00037 mfd. Bruno variable condenser
- One .0007 mfd. Bruno variable condenser
- Five Amperites for U.V.-201A's
- Two Pacent jacks
- Two Amertran audio frequency transformers
- Three pieces Bakelite tubing 3" long and 3" in diameter
- One 7x25 baseboard
- One 7x1 hard rubber binding post strip
- One .0005, .00025 and .006 mfd. Dubilier Micadons fixed condensers
- Seven Eby binding posts
- One pound No. 22 or No. 24 D.C.C. wire

You will remember Mr. MacIlvain said that more stages could be added, the set made more sensitive, and that it would still retain its stability. Well, Dr. L. R. Burdette, of Salem, Oregon, set out to prove it—adding one more stage of radio frequency. He says: "I do not find it any more difficult to tune than with two stages. I am at present using dry cell tubes, but when I put in six-volt tubes this winter, I feel sure that I will be able to get anything in the whole country." We are printing here a photograph of Dr. Burdette's beautiful receiver.

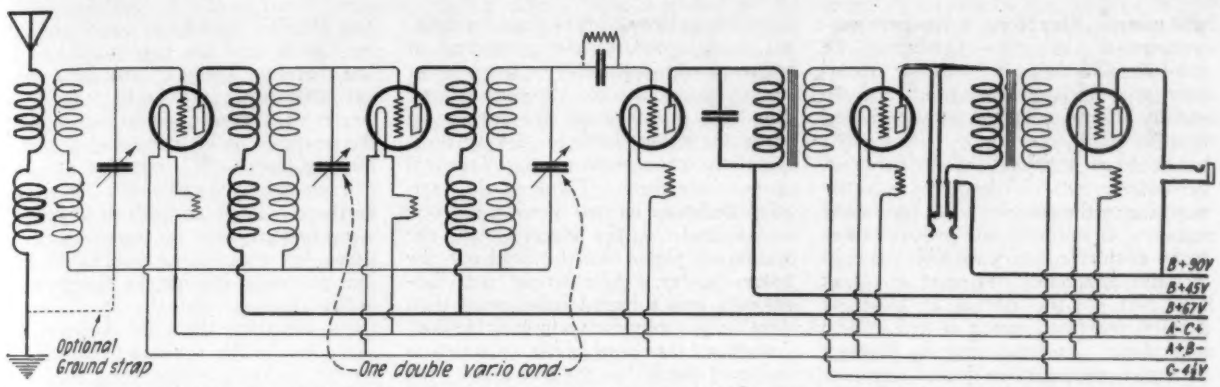


Dr. Burdette's beautiful D-coil set with three stages of radio frequency in a mahogany cabinet

Its excellent tone quality has appealed to so many fans. When the phones are plugged into the second step of audio, the hissing and frying noises present in so many other sets are conspicuous by their absence and only a slight "live" noise shows that the set is in operation. The capacities and resistances in most tuned radio frequency receivers tend to distort the signal and in the D-coil where we leave out these disturbing factors, only the best remains.

Some of you asked if the D-coil was selective. Mr. H. W. Schaller of Brooklyn, N. Y. writes, "I thought that my three-circuit regenerative set had them all beat for selectivity but my D-coil is the only one that will tune out WNYC on 526 and bring in WIP on 509 in my location."

To those of you who had trouble in covering the broadcast waveband, remember that Mr. MacIlvain's original receiver employed very low minimum capacity variable condensers to tune with around the order of .000012. This feature enables you to go down. If you have high minimum condensers and you find it impossible to go below 300 then look to the condensers first. The capacities of the Bruno condensers used in the special two-control D-coil were, a .000006 mfd. to .00035 mfd. to tune the grid circuit of the first R. F. tube and a .000009 mfd. to .0007 mfd.—rotor



In the diagram note the second and third condensers. Their rotary plates are part of the common negative A lead. Their stationary are connected respectively to the grids of the second and third tubes

plates divided into two sections—to tune the second and third astatic transformer. Note that with these condensers the transformers have ten turns in the primary and fifty turns in the secondary. In order to accomplish this tuning of two circuits with one condenser or rather two condensers on the same shaft it is necessary to exercise great care in winding the second and third transformer. They must have exactly the same length of wire in each and their windings must cover the same length of space on the tube. The ten and fifty turns require approximately one and seven-eighth inches on our receiver. Dr. Burdette in winding his coils gave the following hints on their construction. "Have a piece of soft wood turned at any sash and door factory that will fit snugly inside of your tubing. Next cut off a piece a little longer than your tube, say 3½ inches. Saw a ½ inch slot exactly through its center, from one end to within an inch of the other end. Then make four grooves on the outside of this wooden cylinder so the heads of the screws for the binding posts will pass freely down them. When the wooden cylinder has been slotted and grooved, screw it to the top of a bench, and slide the unwound tube over it. Tighten the binding posts in place with one tap before putting on form. The end of the wire can be held between this first tap and a second tap and still have enough room on the post for a battery terminal tap for attaching your bus bar.

By using a couple of rubber finger stalls and letting the wire bend sharply over the finger tips I was able to put

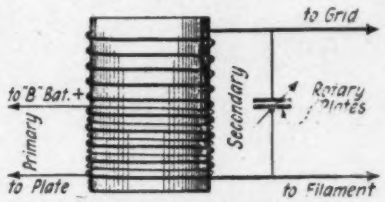
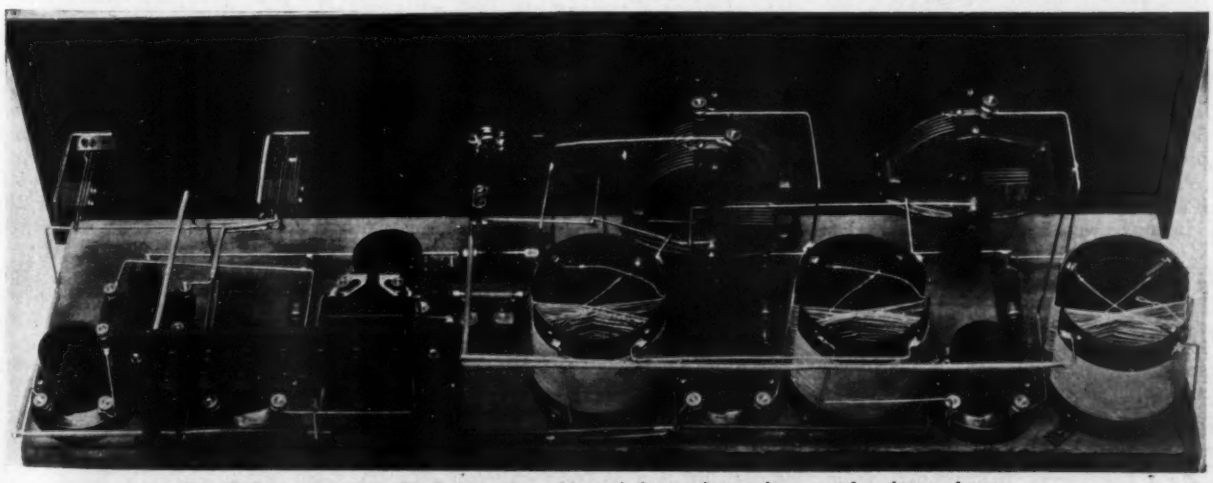


Diagram showing connections of the leads on the astatic transformer

considerable tension on the windings. Upon removing the tube I had a beautifully wound tube comparing favorably with a factory job, and the wire was D. S. C. at that. Furthermore, the coils were perfectly round."

We knew it was a good set before we allowed it to go into our magazine, but nevertheless it makes us feel good to know that our readers like it as much as we do.

Here are some construction hints and operating helps on the D-coil receiver. In the first place you will note a few points in the "A" battery and "B" battery connections that differ from the original article. For these suggestions some credit is due D. G. Ward and R. E. Bogardus of the Radio Institute of America. In the first place you will note the change in the position of the amperites controlling the filaments on the radio frequency tubes. The return lead from the grid goes to the negative side of the filament and the amperite is placed in the negative filament leg between the tube socket and the return lead from the grid. The grid of the R. F. tube then is operating, when no signal is coming in, at a negative potential which is almost the value of your "A" battery — in other words about six volts. On a standard UV-201A this negative bias permits greater signal amplification consistent with a moderate plate current drain and good tone quality. In the opinion of a well-known engineer, better results will still be obtained by by-passing the resistance of the amperite control by a small .001 mfd. fixed condenser. As your filament control, be it a rheostat or amperite, is in the radio frequency circuit it naturally forms a radio frequency resistance and is inductive and losses



This tilted rear view of the D-coil shows the positions of the astatic transformers and tuning condensers

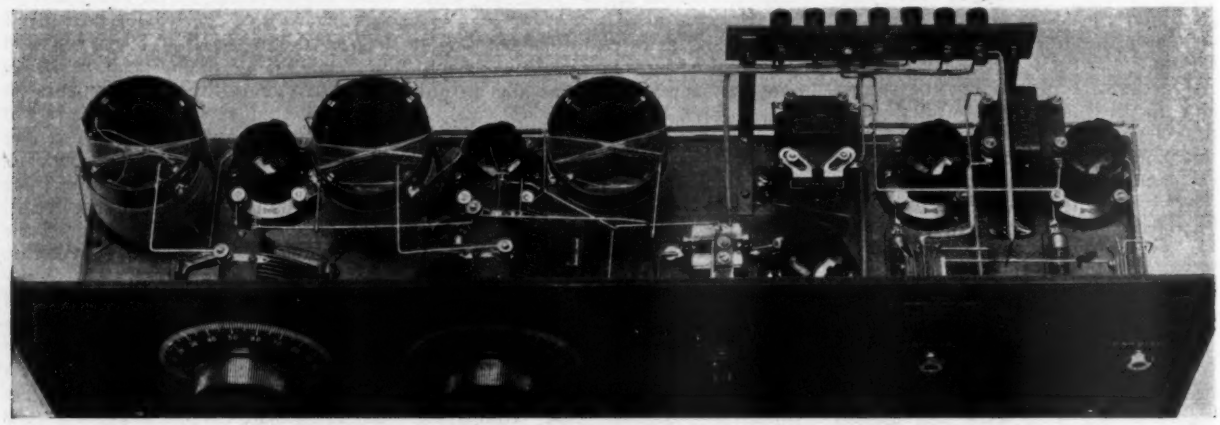
will occur. Therefore, it has been recommended that this condenser be tried in each of the R. F. tubes. However, it is not very important, and we merely offer it to you as an experiment worth trying.

We have always been in favor of grounding the "A" battery with the negative or the positive. We have done it here. It not only will reduce noises in an audio frequency amplifier, but in a radio frequency amplifier it places one part of the circuit at least, at ground potential, which is in itself an advantage. In grounding the filament all that is necessary to do is to connect the grid return of the first R. F. tube as it comes out of the secondary winding of the first astatic transformer to ground and this can be done by merely running a wire from this binding post to the ground binding post. If this is done immediately at the transformer it will be much more satisfactory than to do it at the binding post strip.

We have had several letters concerning the advisability of placing a variable gridleak on the detector tube. Some asked if it were necessary and if there were any advantages to be had from its use. In the original set and in several others which we have constructed we tried several values of gridleak and found it not to be the least bit critical. With the UV-201A in the detector tube socket values from ½ to 5 megohms were used without any appreciable difference or advantage. When using a UV-200 the 1½ and the 2 megohm seem to be the best, but the advantage was very slight. So we advise and this advice came from actual trial, the use of a fixed tubular inclosed gridleak in this position. However, this must not be taken as derogatory to variable gridleaks in a regenerative set where the control of the gridleak and grid potential is essential and very critical. In fact the regenerative action of the tube almost demands it.

To go back to the grounding of the grid return. The Bruno Ultra Vario Condenser, like all other good condensers, is designed for the grounding of the rotor plates which frees the receiver of any possible hand capacity effects. We have preached on this subject of grounded rotor plates for a long time, but there are still those who disregard these instructions. Think of the variable condenser as two wires, a live one and a dead one, the live one being the stationary plates and the dead one the rotary plates. You would not consciously grip a high tension wire, then why do you connect your variable condenser so that your shaft to which is fastened the dial is the live side of the circuit? On good condensers the rotary plates and the shaft are grounded to the metal framework of the condenser through practically perfect connections in the bearings. So in all circuits connect the rotary plates to the ground or filament side of the circuit and the stationary plates to the grid or plate or high potential side of the circuit.

Now let us argue the old "C" battery question again. Recall your characteristic curve for the UV-201A and note the steep part of the curve as it rounds out from the negative side of the curve. As soon as the curve begins to steepen and becomes straight your audio frequency amplifying tubes amplify to the best of their ability. The purpose of the "C" battery is to maintain this position on the curve. When using 90 volts "B" battery potential on the plates of the 201-A the 4½ volt "C" battery is generally the correct value. This "C" battery not only clears up the tone of your amplifier, but materially reduces your plate current drain from your B battery, thus lengthening the life of the B-batteries and reducing the operating expense as well as giving you more favorable reception. Just because your amplifier gives forth a great volume of sound, it does not mean that it is operating as it should. Read the instructions on the little pamphlet inclosed with each standard tube and note how the "C" battery is connected into the circuit and the explanation of its use therein. Many of you have written concerning the small fixed condenser of .006 mfd. connected between the positive "A" battery and a 45-volt binding post. "B" batteries are very essential parts of radio sets. They must be there. Their purpose is to provide a positive potential on the plates of the tubes, but there is no law which says that you must include the resistance of a "B" battery and the long connections between the "B" battery and your set in the sensitive part of the circuit carrying radio frequency currents. To avoid making the radio frequency current pass through this high resistance we use this .006 mfd. condenser through which the radio frequency current will pass without interruption. These are all little operating hints on this excellent receiver.



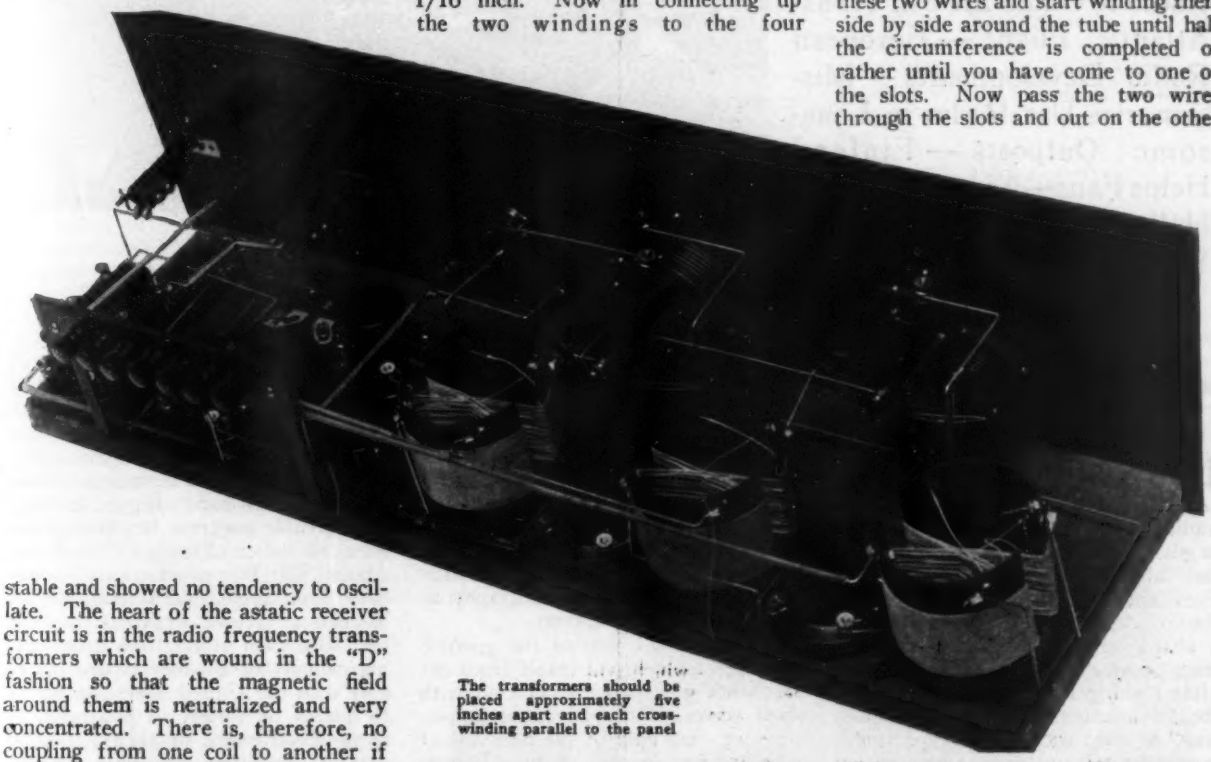
The simplification of control has been our aim in this receiver. Only two controls and an on-off switch

We feel sure that somebody is going to write us after taking one look at this receiver and tell us that the audio-frequency transformers are too close together. They are not and we have proved it. The transformers used were Amertrans and we have found that it is possible to place these excellent transformers as close together as an intervening socket will permit without any indication of inter-stage coupling or any whistle or any other undesirable effects, which goes to prove what we have tried to tell you for a long time that in radio everything is worth just what you pay for it. If you buy good parts and put them together right, the result is a good set. It can't be otherwise.

We had a few letters from some readers who did not closely observe the diagram showing the rear view of the set and as a consequence placed the D-coils so that their cross windings were at right angles to the panel and the edge of the baseboard. In this position the astatic transformers do not neutralize their respective fields which is the sole object of their peculiar figure

8 construction. Look at the diagram showing the baseboard arrangement of the parts and see how these coils are placed with respect to each other and in building yours place yours accurately in the same position.

This receiver, using the astatic transformers, employs no neutralizing condensers nor any damping resistance to prevent oscillation and it functions better than either of these methods because the radio-frequency amplification can be carried to a higher degree. We have used three stages of astatic transformer coupled radio-frequency amplification and the set was perfectly stable and showed no tendency to oscillate. The heart of the astatic receiver circuit is in the radio frequency transformers which are wound in the "D" fashion so that the magnetic field around them is neutralized and very concentrated. There is, therefore, no coupling from one coil to another if placed in the position shown in the diagram and in the photograph. Due to this fact, these transformers may be located in the receiver assembled in a vertical position and it is not necessary to spend a lot of time in setting them at some critical angle as with most of the neutralized tuned R. F. circuits used at the present time. There will be zero coupling between these transformers when aligned in a vertical position. D. G. Ward, well known for his excellent treatises on variable condensers which we printed in the June and July issues, has furnished some valuable hints which we are passing on to you on the coil winding. In the first place secure your Bakelite tubing, then cut it 3 inches long. Drill the four holes for the respective binding posts and in these holes fasten your binding posts, or nut and bolt combination which is to hold the soldering lug for further connections. Now mark on opposite sides of the diameter of the tube a section ¾ inch wide. Down these sections cut slots with a hack-saw until within ¾ inch from the bottom of the tube. A ¼-inch slot was originally recommended, but after we had made some eight or ten of these astatic transformers we decided that it would be 100 per cent. easier to make the slot ¾ inch and it has no material effect on the operation of the transformer. Incidentally don't try to cut two slots at one time, we did and it doesn't work, and be very careful of the Bakelite tubing in the cutting process. It is not wise to use a greater thickness than 1/16 inch. Now in connecting up the two windings to the four binding posts get the old head athrobbing and figure out this way; your secondary winding has to go to the variable condenser in each case. Therefore, connect the two ends of the secondary winding to the two binding posts on the side of the coil nearest the variable condenser. This reduces the length of the leads and is exceedingly more efficient than running your highly important gridleaks all over the set before they reach their destination. Now your primary has to go to the plate of the preceding tube and to the positive of your "B" battery. The positive of your "B" battery is high potential stuff so remember the old rule, keep the high potential wires as far away from the panel as possible and the low potential near the panel. If the two secondary binding posts are placed on the panel side of the coil then the "B" plus and the plate posts will be on the opposite side, or the extreme rear, from where the lead is to the plate post of your tube socket, and your "B" battery leads are far away from possible contact with the filaments of your tubes. It is practically impossible to get this set in less than 26 inches of panel space. Now let us go back to the winding of the transformer. Note the diagram of the transformer with respect to the connections. Cut off 14 feet of No. 22 D. C. C. wire and fasten one end of this to the post which is to go to your plate. Take the remainder of the wire on the spool and fasten one end to the post which is later to go to the filament. Now take these two wires and start winding them side by side around the tube until half the circumference is completed or rather until you have come to one of the slots. Now pass the two wires through the slots and out on the other side and wind in the opposite direction until you come to the slot again. You have now completed one complete turn of two wires. Continue this for a total of 20 turns, 10 of which will be the primary and 10 of which will be the secondary winding. Your primary winding will now stop here and its end will be connected to the B plus post. Continue the secondary winding for 40 more turns. You will remember Mr. MacIlvain's transformer proportions were 10 turns in the primary and 40 turns in the secondary, but you will also remember that he used 43-plate .001 mfd. variable condensers. By the addition of 10 more turns on the secondary, that is the 10 to 50 ratio, a condenser having the maximum capacity of .0003 or thereabouts will tune to the entire broadcast waveband. If you do not happen to have condensers of this capacity the standard 23-plate .0005 will serve the purpose.



The transformers should be placed approximately five inches apart and each cross-winding parallel to the panel

World Wide News

Broadcasting the arrival of the World Fliers at Mitchel Field through WJZ and WGY

Radio to Guide ZR-3 in Trans-Atlantic Flight — European Radio Developments — Missionaries Use Radio in Lonesome Outposts — Finland Helps Fans—Nine Stations in Holland — New York Greets World Fliers by Radio

By C. S. ANDERSON

Managing Editor of THE WIRELESS AGE

Sarnoff Returns From Europe —Views on Radio Developments

JUST returned from Europe where he remained seven weeks visiting the leading radio engineers and scientists in governmental and private radio circles abroad, David Sarnoff, Vice-President and General Manager of the Radio Corporation of America, is still a champion of long wavelength for trans-oceanic radio communication after making a thorough analysis of the developments which have gone forward in short waves in Europe, under governmental and private supervision and initiative.

"I have seen nothing, as yet, in this new field of short waves either in Europe or at home," said Mr. Sarnoff, "which justifies the claim that the present high-power long wave stations employed for commercial trans-oceanic communication will be supplemented by the low power stations. Reliable radio transmission over long distances during the daylight and business hours, must still be conducted with high-power and long waves, such, for example, as we are now using at Radio Central, on Long Island, N. Y. The possibilities of radio development in all branches of the art, however, are too great and promising to permit any negative views that its advance will stop here or there.

"While in England, I saw a good deal of Mr. Marconi and his experiments with short waves. These experiments have given fresh impetus to the work of research men and radio engineers in the United States, where the short-wave field has been under scientific investigation for several years. It may be confidently expected that the use of short waves will immeasurably and in a practical way advance the art of radio communication in the field of wireless telegraphy as well as wireless telephony.

"To my mind, one of the greatest advantages which will result from experiments now being conducted with short waves, is the increased knowledge we shall gain of the behavior of different wavelengths in the conducting medium between the sending and receiving stations. Much has already been accomplished in perfecting the radio sending and receiving instruments but much more still remains to be learned about what actually occurs to the electro-magnetic waves in the space which separates the receiver from the transmitter. As we learn more about Nature's secrets, now hiding in the great outdoors, we shall come nearer our goal of completely eliminating static, interference, fading and other scientific problems still requiring solution.

"I investigated the broadcasting systems of England, France and Germany, and met the principal persons both in governmental and private circles, responsible for the development of radio in Europe. My conclusions are, that broadcasting, which was initiated in our own country, has advanced in the United States, both as a public service and as an industry, to so great an extent as to make comparisons with European countries almost impossible. In France it is just beginning, and in Germany it has hardly begun. In England greater progress has been made than in other European countries. About 800,000 government licenses have been issued permitting British listeners to receive programs from the air. But even in England, broadcasting cannot be said to compare favorably with the United States, either as to quality or variety of programs, or as to effectiveness, simplicity, or small cost of receiving apparatus, manufactured and sold for home use.

"Nor is there to be found abroad the same freedom from censorship and restriction which exists here. For example, in England, where freedom of speech has been such a heralded tradition, political broadcasting is forbidden over the radio stations, which are all controlled by the British Post Office. In other European countries, governmental regulations and restrictions are even more severe, and these, in a large measure, restrict and retard the growth of the broadcasting art in Europe, and at the same time deprive their listening public of the freedom, enjoyment and instructive information available to all in the United States.

"I endeavored to interest the British, French and German broadcasters in the idea of increasing the power of their sending stations, so that the programs of London, Paris and Berlin

might be easily heard by the American listening public. At the same time I suggested the possibility of American stations sending over their programs, which could be regularly heard abroad. Much interest was shown in these proposals, and I believe that an era of trans-oceanic broadcasting is near at hand. Realization of such a plan would greatly enhance the value of broadcasting to the public on this side as well as on the other side of the Atlantic Ocean, and help to bring the old and the new world a little closer together."

Missionaries Use Radio in Lonesome Outposts

MISSIONARIES in lonesome outposts of the world are availing themselves of the radio. A missionary in northern China listened to his bishop talk from Canton and it was the first sermon he had heard in a year.

Herbert E. B. Case, of the American Board of Foreign Missions, reports that missionaries have recently purchased apparatus to take to their fields. These will be located at Smyrna, Turkey and in St. Silinda, South Rhodesia, Africa. The missionary in Smyrna hopes to get messages from Vienna, Berlin and Paris. The missionary in Africa probably will receive messages from Johannesburg.

In our Pacific agency, Rev. A. W. Mell, in San Francisco, has been broadcasting the Scriptures at the noonday hour for several months. Station KPO gives time signals at 12 o'clock sharp, then immediately follows the Scripture broadcasting. First some hymn or two is played on the chimes, then reading of a few chosen verses of Scripture, followed by a repetition of the chimes.

Radio to Guide ZR-3 in Trans-Atlantic Flight

EACH day now finds the Navy Department checking up and perfecting its plan to participate in the next epoch-making air event, that of assisting in the bringing of our war prize, the ZR-3, the largest airship in the world, from Germany across the ocean to the United States.

Equipped with a radio receiver enabling it from its start in Germany to pick up the Eiffel Tower in Paris and a little later the Arlington Station in Washington, the ZR-3 has a specially designed sending apparatus of 1.5 kw. input power furnished from a 50-cycle, 220-volt alternator. The set is capable of putting 200 watts into an antenna consisting of 3-400 feet trailing wires let out and hauled in simultaneously from reels in the radio car. The transmitter uses 6,000 volts on the plates and employs two rectifier tubes with the master oscillator system. There is a guaranteed range of about 1,500 miles.

To maintain radio communication, three light Navy cruisers will be stationed in the North Atlantic. The U. S. S. *Potoka* will be approximately 300 miles south of Cape Farewell, Greenland. An observation ship will be approximately 300 miles south of Cape Rose, and a radio relay ship will be about 250 miles east of Halifax, N. S.

In addition to the cruisers, many land stations, such as Bar Harbor (NBD), Annapolis (NSS), Norfolk (NAM), and Lakehurst (NEL), have a definite part in the plans for bringing the great ship to this country. Altogether, it will be one of the most unusual radio events in our history, and it is expected the ship will be in constant communication with our stations on land or sea until the ZR-3 is safely housed in its new home at Lakehurst, near New York City.

Radio Replacing Telegraph in Alaska

RADIO is gradually replacing the land telegraph lines operated by the Army Signal Corps in Alaska. A new radio station has just been installed at Wiseman, in the Yukon country, opposite Bering Strait, and north of the Arctic Circle. Radio plays an important part when the cables between Alaska and Seattle are broken or the service otherwise interrupted. This is quite frequent, inasmuch as Alaskan waters are continuously subjected to earthquake disturbances.

Nine Stations in Holland

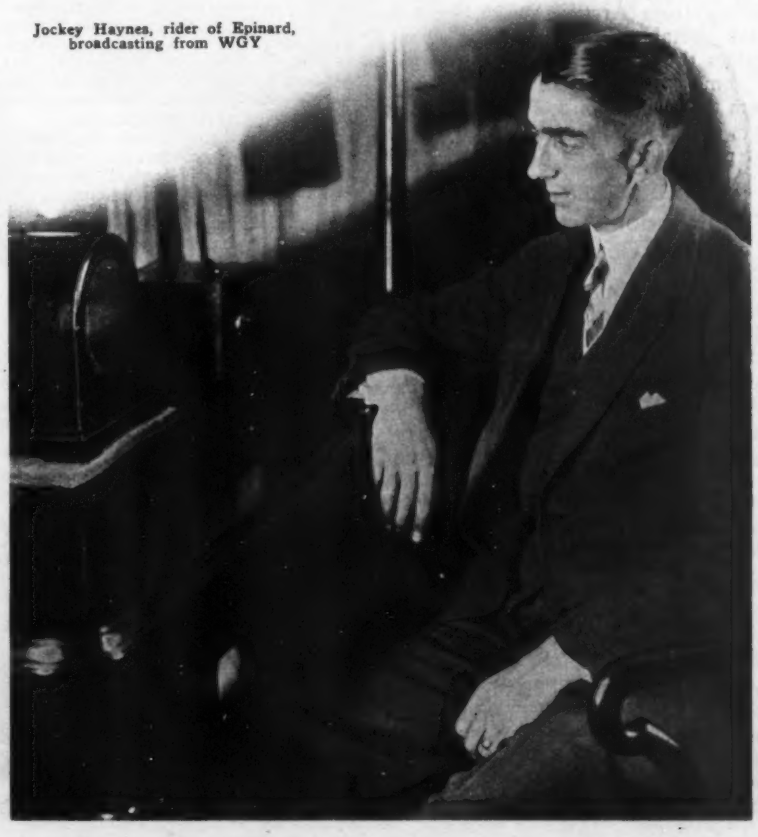
THERE are at present seven private and two State corporations broadcasting in Holland, and it is reported that there are approximately 20,000 listeners. There is no license fee on receiving sets, but corporations wishing to establish broadcasting stations must obtain a permit from the State Department of the Waterways. The fee charged for this permit depends upon the purpose of the broadcasting corporation and the number of hours the Government allots to it for radiocasting.

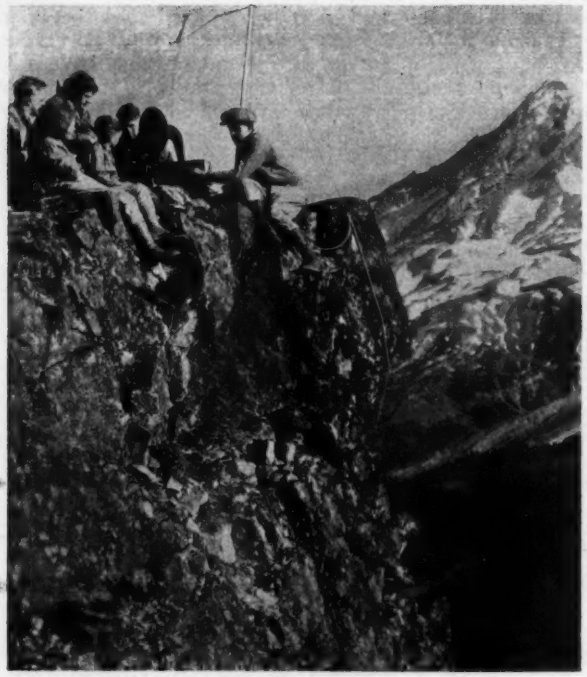
Finland Helps "Hams"

THERE is a growing interest among radio amateurs of Finland in private radio telegraph communication with operators in Denmark, Holland, Luxemburg and France.

For a small country, Finland has taken a most friendly interest in the welfare of its amateurs and the government has allotted them a maximum transmitting wavelength of 300 meters and a power range of 5 to 20 watts.

Jockey Haynes, rider of Epinard, broadcasting from WGY





Listening in on Pinnacle Peak, Rainier National Park, 6,665 feet above sea level

Geologists Communicate With Washington From Northern Alaska

GEOLOGISTS Philip S. Smith and J. B. Mertie, Jr., of the Geological Survey from Arctic, Alaska, have a small portable set with them, which enables them to get messages through to some large station, which relays them to Washington. The two geologists are examining the naval petroleum reserve at the northernmost point in Alaska.

"Shenandoah" to Broadcast Cross Country Flight

THE navy's monster dirigible, the *Shenandoah*, expects to give radiophans throughout the country a chance to see it in action, as well as listen in on its transmitting apparatus, during the next month or two. Naval officials are planning a cross-country flight some time in October. No route has yet been determined for the *Shenandoah* to follow, but it is understood that the most direct route to San Diego, Calif., and Seattle, Wash., will be selected.

Third National Radio Conference

ANNOUNCEMENT has been made by Secretary Hoover of the calling of the Third National Radio Conference for better voluntary regulation of radio. The conference will be held at Washington, beginning September 30.

Two such conferences have already been held, one in February, 1922, and one in March, 1923, both of which were generally attended by the persons and organizations interested. The result has been a lessening of friction and misunderstanding through the voluntary co-operation of the industry, the public and the Department of Commerce, especially in the reduction of interference and the improvement of service.

The growth of radio and particularly the multiplication of broadcasting stations and the consequent congestion of the air has made necessary a consideration of many subjects and perhaps a revision of some present methods. Some of the matters which will be discussed and considered at the conference are:

Revision of the present frequency or wave length allocations, to reduce interference.

Use of high frequencies or short waves.

Classification of broadcasting stations; possible discontinuance of Class C stations.

Interconnection of broadcasting stations.

Limitation of power; division of time; zoning of broadcasting stations.

Means for distinguishing the identity of amateur calls from foreign countries.

Interference by electrical devices other than radio transmitting stations.

New York Greets World Fliers By Radio

DEVOTEES of the radiophone were kept in close touch with the movements and the whereabouts of the around-the-world army aviators as they made their flight from Boston to New York. Their every move was made known by Major William N. Hensley, commandant at Mitchel Field, who accompanied them in a De Haviland plane equipped with radio apparatus.

From the air, he described flying conditions, the crowds in the streets of lower Manhattan, the waters of the Sound and the ships about him. The relay station set up by the Radio Corporation of America at Mitchel Field picked up his messages and broadcast them through stations WJZ, New York, and WGY, at Schenectady.

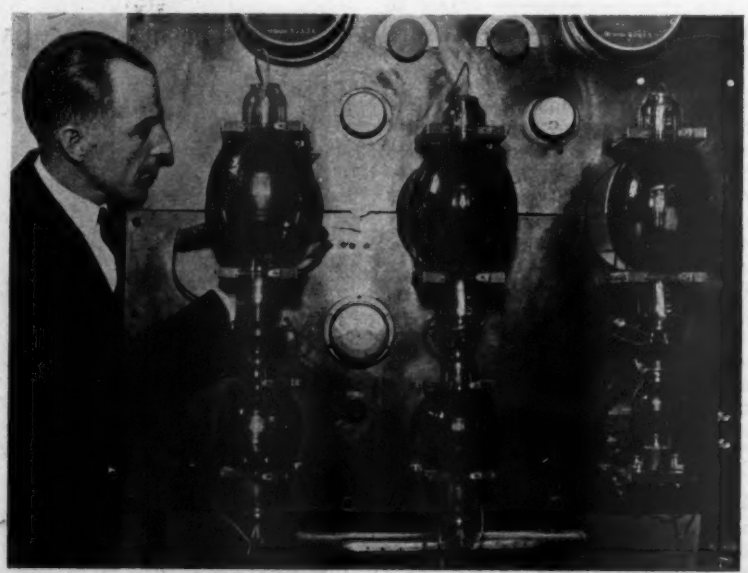
Mindful that his New York audience was not familiar with conditions that attended the start of the Boston to New York flight, Major Hensley repeated all items of interest that featured the start.

"It was rather hazy when we set out from Boston," he said, "but it cleared up again in about an hour. Every once in a while we'd run into a drifting cloud of haze and would lose sight of one another, but here we are, all together again and heading over Long Island Sound."

"Gosh! It looks like the old town is seeing the boys in right," he said with a degree of boyish enthusiasm.

Major Hensley then described the round-the-world planes so that those on the ground could distinguish them from the rest of the fleet.

It was a triumph for the radio in every way.



Canada's most powerful radio station, CKAC, uses electric current supplied by the city which is rectified by these last two tubes

THE OUTLINE OF HE

who wrote

"THE OUTLINE OF RADIO"

John V. L. Hogan "comes across" and tells the story of his early adventures in radio—the first high-powered Naval Station at Brant Rock—the original Arlington time-signal test—his work under Fessenden—and his present day activities

By Golda M. Goldman

"YOU know," said Mr. Hogan over the phone, when I requested an interview, "I'm not very keen on this Hall of Fame stuff!"

He finally decided, however, that he couldn't deprive me of my "story," and that no matter how much he might suffer he would see me. So before I had ever met him, I was sure of two things about him—he is unassuming, and he is considerate of others!

Not that that was my first knowledge of Mr. Hogan. I knew that he had written the most popular radio book of 1924, "The Outline of Radio," which has already gone into four editions. That, you will immediately realize, is startling in a field where fads and foibles change overnight, and the facts of today are the out-of-date fancies of tomorrow.

Mr. Hogan's book is indeed an excellent introduction to him, and if you will but read it, you will know quite surely just what manner of man he is. First of all, this book does for radio what H. G. Wells, in his "Outline," does for history, and what Hendrik Van Loon does for the human race in his "Story of Mankind." A life-size job, you say? Well, who could do it better than John Hogan, who has been in the field since 1904—but I'll let him tell you about that himself a little later.

To stick to the book for the present, you will find here a history of the development of radio from the beginning in 1842, when Samuel B. Morse transmitted messages across a canal at Washington, using only the slight conductive power of the water to carry the electric telegraph current from one side to the other. It ends with the nation-wide and trans-oceanic broadcasting of today.

John V. L. Hogan

It has been said that no one really understands a subject unless he can make it clear to some one else. This is the supreme test which Mr. Hogan's book passes; whether he is explaining how radio waves are created, or how the signals flash through space, or whether he is discussing radio as a public service and looking at its future possibilities, his grasp of his subject is competent and his manner of presentation, including his excellent diagrams, clear enough for the amateur to understand perfectly. That is why it is being used in courts of law when a case necessitates a clear understanding of some radio principle.

When I looked up Mr. Hogan's 'phone number in the book, I found next his name the title "consulting engineer," so when we were seated in his office, and he had his pipe comfortably lighted, I asked him first of all what that meant. He told me:

"'Consulting engineer' is not a degree. It is merely like a doctor who has become a specialist in some one thing, and who is called in by other doctors to give his opinion on certain cases. I am called upon by other engineers to look over some of their work in radio construction, and make corrections or suggestions. Another important part of my work here deals with patents. Many times a man invents some piece of apparatus and wishes to put it on the market, but there may already be that very thing patented by some one else, about which he knows nothing. If he brings it to me I can tell him whether or not he can legally go ahead with whatever he is doing."

"How on earth?" I wanted to know, "did you find time to write a book?"

"Self-defense," smiled the engineer, hooking his fingers over his belt and puffing happily at his pipe. "People want to know what really happens inside their sets, and I get asked the same questions over and over. So I figured I'd save time if I could just say, 'Go look in the book. It's all there.'

"Three years ago," he went on, "I wrote a series of sixty articles for the *Evening Post*, of New York City, explaining how and why the radio works, but last year I had a wonderful opportunity to find how deeply the fans are interested in this sort of thing. I talked last winter from WEAF and WCAP on the workings of a radio set. It was really an experiment, as we wanted to see what they would think of talks over the radio about the radio. The first ten talks were on interference. Any one who sent in a

(*Turn to page* 80)

A Well Built and Well Designed Set With a Wavelength Range Which Is Truly An Innovation in the Field of Radio Receiving Sets

A 60 to 600-Meter Tuner

By ROBERT ALAN

TUNING down to 60 meters is impossible on the average broadcast tuner. In fact, you probably have never had that experience.

With the new 60-600 meter tuner you can do just that and do it well.

But here is the big surprise. You can tune to 100, 200, 300, up to and over 600 meters on the 60-600. And there you are: A tuner that tunes from 60 to 600 meters with a very high degree of efficiency over this entire range is worth something these days.

You may ask: "Why have a tuner that will go down to 60 meters?" Why? Because there are two very fine stations re-transmitting their programs down there now and many more are on their way down. Between 60 and 100 meters the tuning is very sharp. Static is hardly noticeable and there is no fading. Furthermore, in New York City it is possible to hear these two stations with almost "local" strength when they are almost, if not entirely inaudible on their normal higher waves.

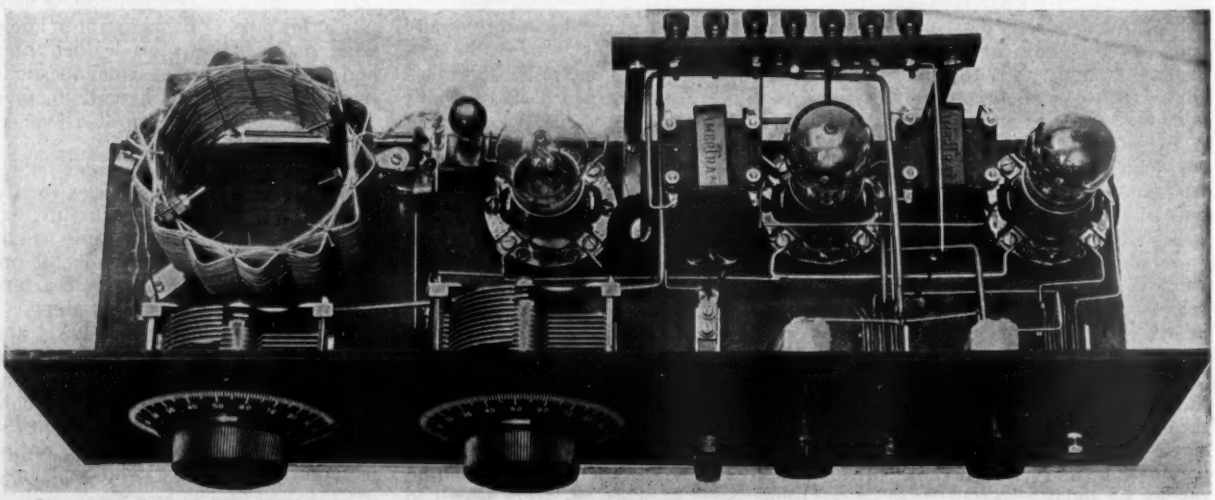
Now that you're convinced on that point, you may inquire, "Why have a tuner that will go up to 600 meters?" Ah!—that's it—up where those mysterious dots and dashes are breaking through the ether. That's where the real up-to-date B. C. L., who is fast learning what they mean, listens for that perfect sending from the operators of good old WIM.

You want to build one and do this too? You do? Well, here's how.

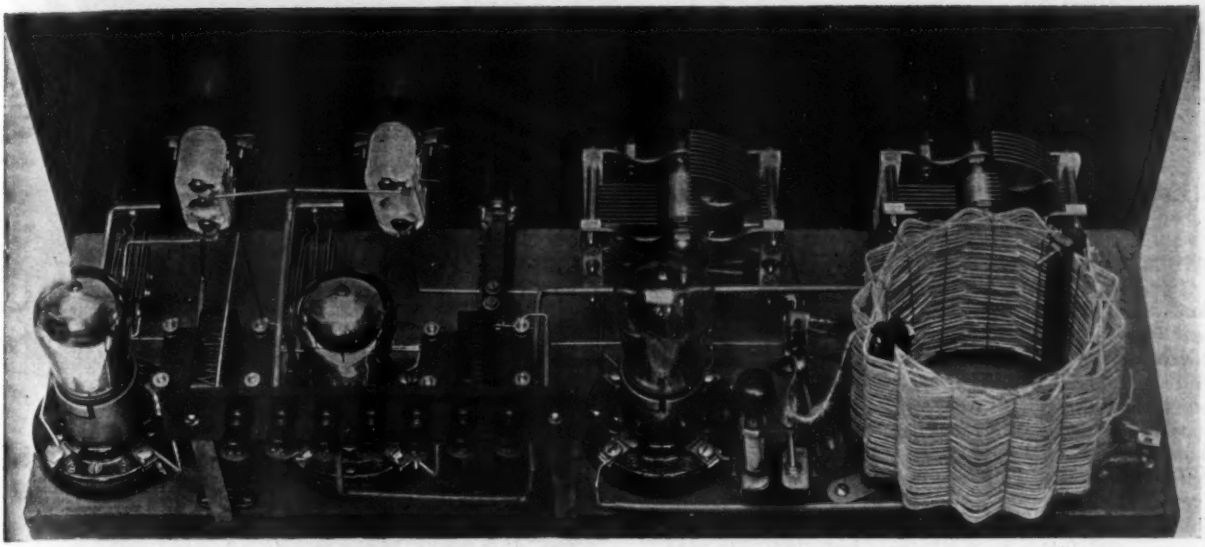
Constructional Details

The only part of this receiver which will involve any difficulties to the home builder is the construction of the tuning coil. This consists of about 90 turns of No. 18 D. C. C. To secure best results it is best to use double cotton covered insulation. The single cotton insulation is not strong enough to withstand any rough treatment in the course of winding the coil, and the single-silk and double-silk-covered wire in this winding is not considered as good an insulation as the double-cotton-covered. Before winding the coil secure a piece of strong 7/8 inch wood 6 inches square (we used 3/8 inch Dilecto, but the wood if strong enough will serve the purpose. Lay out on this piece a circle 4½ inches in diameter and divide its circumference into thirteen sections by the use of an accurate pair of dividers. Then drill at these intersections holes big enough to take a good sized 6 inch spike. The holes should be of such size so that the spikes can be removed. Then drive into these holes the thirteen spikes.

The windings should then be started. The plate coil comes first and consists of 45 turns of wire. The turns are made by going outside one spike and inside the next two then outside one and inside the next two, etc. A tap is taken at the 30th turn. When this winding is completed break the wire, leaving about 8 inches of it for connection purposes, then right at the end of this winding start the secondary or grid winding. Continuing in the same direction wind eight turns of wire, which will form the antenna circuit. At the end of the eight turns take off a tap and wind 40 more, which forms the grid coil. These 40 turns should be tapped at the 10th. When the winding is completed take several yards of 16 pound test fishline and between the spikes where the wires cross tie up the coil. At each cross section of wire the coils should be fastened with this fishline. When the coil is completely tied up remove the spikes and the coil. Now to support the coil on the baseboard take four one-half inch hard rubber strips one inch longer than the coil itself and drill one-eighth inch holes one-quarter inch from the ends of each one. One strip is then put through the loop in the winding form and the other strip placed on the inside of the coil up against the winding so that the two strips clamped together securely hold the coil. Angle brackets are then fastened to the bottom and secured to the baseboard. In the diagram there will be noticed the peculiar form of tapping. In each case the lead from the grid and the



The clips for shorting the unused portions of the grid and plate coils and all other connections are clearly shown and no difficulty in placing the parts or hooking-up the set should be experienced



This illustration together with the one on the foregoing page should enable the most inexperienced to build the 60-600 receiver

plate is fastened to the extreme end of each coil. From this point there is a short length of wire at the end of which is fastened a Fahnstock clip which can be slipped over the end of the tap taken from the coil. This short circuits the portion of the coil which is not used. This arrangement is used in preference to a switching arrangement on the panel since it shortens leads and keeps the high potential parts of the circuit away from the hand of the operator. So much for the coil.

The audio-frequency amplifier and detector are mounted directly in back of the two Bradleystats and flush with the rear of the baseboard. The two angle brackets supporting the binding post strip are made out of ½ inch by 1/16 inch copper ribbon such as is used on oscillation transformers. The parts for this receiver were chosen because they worked well together.

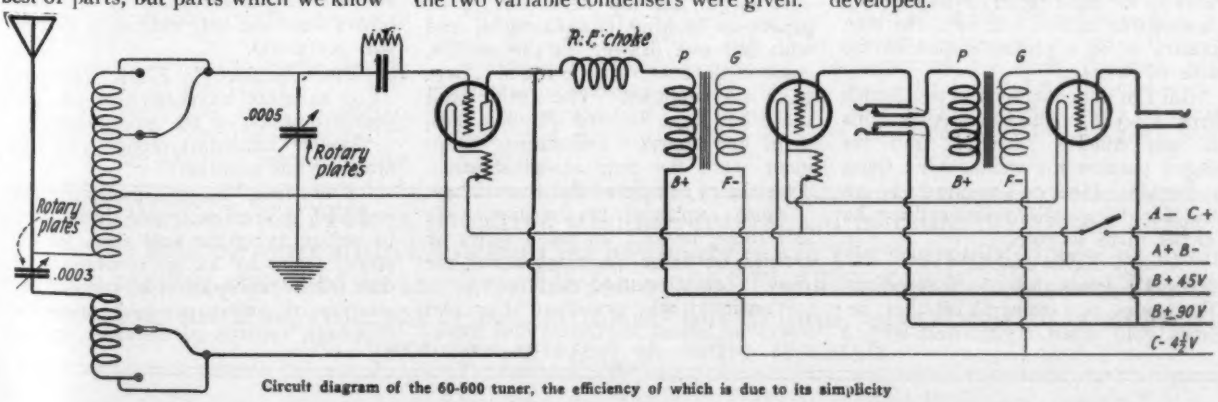
Why go to the trouble of making an excellent coil like this one, with practically no dielectric losses and very low distributed capacity, and then tune it with a variable condenser which is nothing more or less than a poor grid-leak? A receiving set is not better than its weakest part, and in this receiver we have combined not necessarily the best of parts, but parts which we know will deliver the goods, and we have tried to build it like the "One Hoss Shay," each part as strong electrically and mechanically as its neighbor, so that when it does pass out of this life it will do so all at once. The wavelength range of this receiver has probably startled your attention into reading this far in the article. Please note that in the list of specifications the minimum and maximum capacities of the two variable condensers were given. This receiver will cover this wavelength range only when condensers embodying this minimum to maximum range are used.

LIST OF MATERIALS

One .000009 mfd.-.0005 mfd. General Instrument variable condenser
One .000006 mfd.-.0003 mfd. General Instrument variable condenser
One 7x21 Radion panel
One 7x1 binding post strip Radion
Two Na-Ald De Luxe dials
One Carter filament jack switch
Two Pacent jacks, audio filament lighting
Three Standard sockets
Two Bradleystats
Two Amertran audio frequency transformers
One .00025 mfd. grid condenser
One 1½ megohm gridleak
Seven Eby binding posts
Four strips of hard rubber 4"x½"
Eight lengths of bus wire
Three lengths of spaghetti
One 6"x20½" baseboard
One pound of No. 18 D.C.C.

OPERATION

When the set is completed check back your diagram to avoid blowing out perfectly good vacuum tubes, then connect up the batteries, turn on the filament switch and adjust the rheostats. The left hand condenser controls regeneration and the right hand the wavelength. Using the entire windings of both coils, that is with the shorting clip hanging in the air, the wavelength range is from 185 meters to a little over 600. When 30 turns of the secondary are shorted by means of the shorting clip and 30 turns of the plate coil shorted in the same way, the wavelength range is from a little below 60 to close to 200. This method of changing wavelength should not be considered inconvenient because one does not jump from amateur to broadcasting stations as a rule within the space of three seconds and it is a very simple matter to reach back of the panel and to change these two clips in about five seconds. After a careful operating test we believe this set to be one of the best three-tube regenerative sets so far developed.



Circuit diagram of the 60-600 tuner, the efficiency of which is due to its simplicity

The Vansittart Case

By SINCLAIR ARTHUR

Illustrations by Edgar L. Proctor

ONE sunny day Heywood Keith drifted into the city desk of the New York *Dispatch*. The editor listened patiently to his high powered sales talk. It appeared that a live radio section in the *Dispatch* was something akin to vital necessity. And since he—Heywood Keith—happened to be available, the *Dispatch* might well acquire a Radio Editor in no less a person than himself.

The editor solemnly rubbed his nose as he replied, "I've been thinking for some time that I am no longer able to run the paper, knowing as I do, nothing about radio. Therefore, Mr. Keith, your arrival is timely, and your willingness to be available is, indeed, fortunate for the New York *Dispatch*."

Heywood laughed with the others. He did not, however, appreciate the joke.

"But here is a proposition," continued the editor. "Get a story on Henry Vansittart.

"Vansittart was able to get the Chesterfield Oil Grant from Kemal Pasha after England and France had failed in their negotiations. Secret documents and maps, held by the British Government, indicating oil seepages and rich mine locations in Turkey, had been tampered with. Later, the Chesterfield group organized a minerological expedition on the basis of an identical survey.

"Vansittart has since been identified with other transactions involving big capital and diplomatic intrigue.

"And now he seems to be the author of numerous articles pertaining to radio phenomena. He attempts to prove new theories, disprove other theories that have been generally accepted in scientific circles and boldly attacks the principles of radio development. Interviews so far have failed to disclose any questionable tactics. In fact, the man appears to be a philanthropist in the name of science.

"But I'm not convinced. I've a hunch there is some connection between his oil and mining activities and his alleged passion for radio. One thing is certain: Henry Vansittart is an alias for King Midas—everything he touches turns to gold."

"Or oil!" Keith added.

"Yes," acknowledged the editor. "Petroleum is a mineral oil that becomes gold when crystallized with a deft touch from Vansittart or one of his crew.

"And what I propose," continued the editor, "is this: get an interview with Vansittart. Make him talk. If you have a nose for news you'll scent a trail. Then follow it. Your knowledge of radio will probably keep you going straight when he doubles back on his tracks. But don't return until you get the story."

"I'll sell my story to another paper!" he shouted.

"And if I get the story?" Keith asked.

"We'll talk about the radio section," replied the editor.

On his way up to see Vansittart, Keith thought about King Midas. "Everything he touches turns to gold!"

Keith toyed with the fancy. Vansittart would destroy himself if his weakness, whatever it might be, should betray itself. His weakness must be gold. He knew it was the vulnerable point in most men who promote enterprises involving diplomatic intrigue.

HENRY VANSITTART, a slender, iron-gray man, received Keith in his private office.

A large, flat top desk, devoid of papers or writing paraphernalia, and with but one drawer, in the middle, stood in the center of the room. There were no windows. The entire wall space had been utilized for box files, maps and charts. Laboratory equipment were the only embellishments. Two chairs completed the furnishings.

Keith explained his mission. He had come, he said, to get a series of articles on radio phenomena for the New York *Dispatch*.

Vansittart was gracious. For two hours he talked, explained and theorized about radio problems. He submitted for Keith's inspection, innumerable letters from leading scientists, and manuscripts he had, himself, prepared.

During those two hours Keith had not detected a single clue from which he might interpret an ulterior motive. The man appeared to be sincere. His interest, apparently was impersonal. Radio might well be his hobby. Nothing more.

Were Keith to learn what he had come for he would have to resort to drastic action. A direct method must be employed. Keith decided to act. He judged his man, paused a moment to weigh his estimate and then spoke: "Mr. Vansittart, why do you sacrifice time and money for this project?"

"Sacrifice?" Vansittart exclaimed. "Sacrifice?" The inflection of his voice and the slight elevation of his eyebrows were the only indication that he was perturbed.

"Yes, sacrifice!" Keith asserted. "You have not intimated that you expect any return on the investment."

"Well!" Vansittart replied. "I will answer your question."

"These files," he said, indicating the enclosed shelves extending from floor to ceiling along the wall space of his office, "contain an accumulation of data which represents a laborious compilation of newspaper and magazine clippings, records of activities, corre-

"No, you won't!" Vansittart retorted

spondence, and answers to questionnaires; all pertaining to radio and related sciences.

"I send, to leading scientists and to men who are active in the fields of research and exploration, a questionnaire which challenges their defense of some fundamental law or theory of radio development. In their replies I can usually find a reference to some mechanical application of their expositions. For example, someone will illustrate the axial motion of the earth by referring to the gyroscope. There I have another subject for analytical investigation. Again, someone will mention a controversy over the theory of cathodic rays emanating from the sun spots. There again, I have a new field of inquiry which I may profitably exploit.

"And in the mass of data thus compiled, I have a treasure-trove of material well adapted to the purpose of my articles."

"And what," Keith interjected, "is the purpose of your articles?"

"You anticipate me," Vansittart mildly chided. And then he added, "I sacrifice my time and money for the purpose of stimulating research and development of radio problems that have been submerged in the press of new demands which tax, severely, the concentration of engineers. They strive, you know, to cope with the rapid progress of wireless telephony.

"I can juggle with their statements and conclusions in such a manner that my articles will incite the most stringent investigations. Engineers, chemists, and astronomers, who command some of the world's best equipped laboratories, employ the vast resources of those laboratories to my end. Explorers throughout the world obligingly submit their life work for me to exploit. Even laymen, for the most part, radio fans, devote themselves to my service by checking up on radio disturbances and other phenomena common to reception, and then forward to me the result of their findings.

"Keith, you have no idea how seriously the wide world will seize upon a wholly noncommital exposition! I need neither to assert nor deny; I have only to speculate on the veracity of others; and the world kneels to my bidding!"

Keith was impressed. But he rarely indulged in reactions until his purpose had been accomplished.

"What has that to do with oil?" he thrust.

"Oil, oil!" Vansittart replied with a lowering inflection.

"Exactly!" Keith held his ground defiantly. He sensed a strong undercurrent, a surge of emotion in Vansittart's demeanor. The air became tense, vibrant . . .

Vansittart laughed. He laughed heartily, as one who thoroughly enjoys a comic situation.

Heywood stiffened. He was obviously disconcerted. "Why affect such an outburst of emotion?" he inquired, with a tinge of sarcasm.

Vansittart gave way to his merriment again. And then with some degree of composure, explained, "It just occurred to me what you want. Pardon my seeming impudence. Your sincerity, at least, merits admiration."

He lifted his hand to check the involuntary protest from Keith, and continued. "Your paper has sent you out for a story on my Machiavellian operations in oil and mine fields. There will be no harm in letting you have it. So here's the story:

"I OWN a large block of the Chesterfield Oil Grant stock. The oil seepage and rich mine locations in Turkey were very considerately plotted by the British Government in a survey that they launched and financed. Being some what of a crank on economic waste, I managed to secure that survey through Kemal Pasha's agent, thereby effecting a conservation of England's national wealth. That is to say, made use of what might otherwise have been a total loss.

"My next procedure was to allow the overzealous world what latitude it wished for the development of a radio compass that will locate oil strata. Penetrating through gas and water to the oil strata is an uncertain, and costly, operation. A radio frequency apparatus has been designed which only requires a trifle more research by our leading scientists to be entirely practicable for our purposes. Work-

(*Turn to page* 78)

HEYWOOD KEITH, a detective who has specialized in radio mysteries, turns to the field of journalism knowing that newspapers are the source of many problems which remain unsolved in the scramble for news. The first case he discovers involves diplomatic intrigue, couched in the harmless, but skillful, operations of a man who professes interest in radio research

Broadcasting Outside the Studio

Picking up sporting events, political conventions, operatic music, theatrical plays, dinner music from the famous hotels, and public events of outstanding importance so that you may enjoy them at your own fireside by means of radio

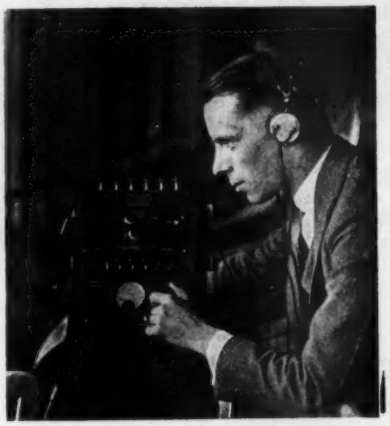
By SAMUEL C. MILLER

"THIS is AJN signing off from the studio. The next voice you will hear will be from the Alamac Hotel where we are broadcasting Paul Specht and his splendid orchestra." Directly after announcer "AJN" has signed off, the broadcast listener is transferred from the studio to the Alamac Hotel where the voice of the new announcer is heard giving the first number on the program.

The broadcasting of outside events has grown with leaps and bounds because of the unlimited amount of material of interest that is available for the entertainment of the broadcast listeners. It can be readily seen that the studio has its limitations, for it would be very impractical and costly to provide space in a studio to satisfactorily accommodate a symphony orchestra or to broadcast a complete opera with its accompanying orchestra. However, with the co-operation of managers of operas, symphonic orchestras, hotels, theaters, organ companies, etc., it has been possible for the director of the broadcast station to make arrangements for picking up the event at these various places and then, by means of special equipment and wire lines, send the music or speech, as it may be, to the broadcast station for transmission through the ether. In this way is the B. C. L. provided with the highest class of entertainment that would otherwise be impossible to give.

The equipment that is required for connecting the outside event with the broadcast station is of prime importance. It is essential that this equipment faithfully convert the sound vibrations picked up by the microphone into electrical vibrations of the same characteristics. Otherwise, a distortion is introduced which is sent out by the transmitting apparatus at the broadcast station and reproduced in the loud speaker at the home of the B. C. L., spoiling the effect of what may be a very interesting program.

It is my intention to give a brief description of this equipment so that the broadcast listener may have an idea of what is going on behind the scenes



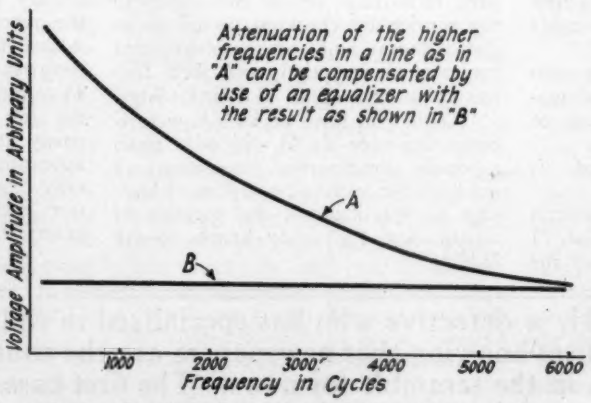
A line power amplifier in use at the World's Series baseball games

at the broadcasting station. The B. C. L. is given very little information regarding the transmitting station and its auxiliary apparatus since a large part of all published material deals with new receiver hook-ups. This article may help him realize the problems that the modern broadcast stations have to solve in order to give him the best of service.

The equipment used for outside broadcasting can be divided into three parts, each part performing a distinct function. These parts are: first, microphones; second, amplifiers; third, lines.

Microphones

The microphone is that unit which picks up the sound vibrations and converts them into electrical impulses of the same characteristics. As the ear picks up the sounds impressed on it and transmits them for interpretation to the brain, in the same manner must the microphone perform a similar function. It should faithfully reproduce with equal intensity the entire range of frequencies that the ear is capable of handling. But sad to state, when comparing any mechanical movements with organs of the human body, we find that we must make the mechanical device very efficient before it can approach the qualities of the human organ. The microphone is a good example. The double button type has been developed after years of research and is one of the most efficient used today. Yet it only recently has approached the level of the human ear as a pick-up device because it had not the frequency range of the ear and it also introduced a very objectionable hiss which was inherent with the use of carbon electrodes.



Graphic chart illustrating the use of equalizers in compensating for high frequency attentuation in line telephony

The double button microphone has a tightly stretched diaphragm with a button on either side filled with fine globular carbon granules approximately 1/64th inch in diameter. The buttons are placed on either side of the diaphragm with equal pressure. The sound waves hitting the diaphragm cause it to vibrate with an amplitude depending on the volume of sound. This diaphragm displacement changes the position of the carbon granules in each of the buttons and therefore changes the resistance of the microphone with a corresponding increase or decrease of current in the circuit. This current change will vary in amplitude directly with the amplitude of the sound vibrations impressed on the diaphragm.

When we consider that the amount of current variation due to the displacement of the diaphragm when sound is impressed on it is very minute, then any internal noise introduced within the microphone itself, although also minute, will produce a current variation of its own and introduce a hiss or crackling sound mixed in with the program. The

amount of foreign noises present depends on the condition and type of microphone used. A good microphone will have a small amount of hiss to signal while a poor one may give equal hiss to signal and thus spoil a good program.

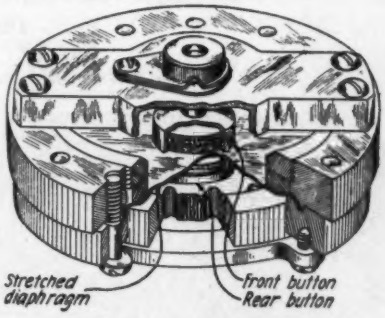
On account of the requirement of a flat frequency-characteristic in the microphone, it has been necessary to stretch the diaphragm to a tension where it will have a fundamental frequency high above the broadcast frequency range. This is approximately 7,000 cycles, which is high enough to have little effect on the broadcast range which covers a band between 30 and 5,000 cycles. But by stretching the diaphragm, it can readily be seen that it also decreases the sensitiveness and output of the microphone considerably. That is, the tightly stretched diaphragm will give smaller amplitude displacement for a given sound input than a diaphragm which is not stretched. Therefore the current amplitude and power output will be considerably less from a microphone with a tightly stretched diaphragm than one which has no tension applied. It may be well, here, to compare the low power output available from a broadcast microphone with that obtained from the microphone used on the standard telephone in the home. The latter has a loose diaphragm. In order that the power obtained from the house telephone be equaled, it is necessary to add to the broadcast microphone about 1,000 times amplification, which is equivalent to a standard detector and two-step transformer coupled amplifier. It is evident that the tightly stretched diaphragm decreases the output of a transmitter enormously if so much amplification is required to bring it up to the same level as the output from a house telephone.

It therefore became necessary to design a suitable amplifier to be used with the broadcast microphone in order to bring up the signal to the proper level. This amplifier is known as a line amplifier.

Line Amplifier

The requirements of a line amplifier are as follows:

1—Distortionless amplification.
2—Ease of control.
3—Ease in carrying.



Double button carbon microphone

The first, that of obtaining distortionless amplification, is very important. A chain is as strong as its weakest link and no individual unit connected with the transmitting station can afford to be the weak link in the system. In order to make the amplifier give as near as possible a flat frequency characteristic, the tubes are either resistance or reactance coupled. By using either resistance or reactance coupling, more tubes are required than in a transformer coupled amplifier. In a standard line amplifier, as shown in the photograph, there are five stages of resistance coupled amplification.

Five tubes are necessary in this amplifier to give an output voltage which is equal to that of the microphone in a standard house telephone. This is the output usually required when working on a very short line connecting the broadcast station and the point outside where the event is picked up. If on the other hand a very long line or a noisy short line is used, enough power must be obtained from the amplifier to ride over the line noise or to overcome the attenuation of the line. For this purpose another amplifier has been designed which is known as a line power amplifier.

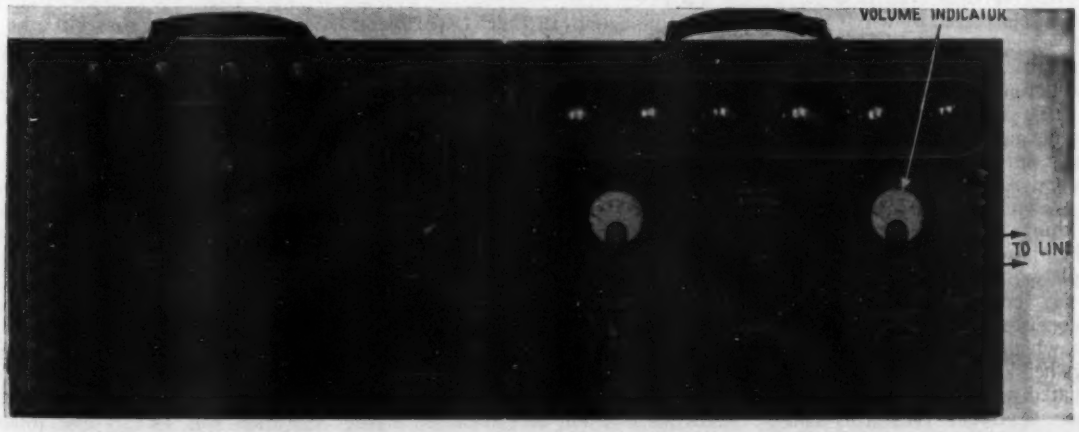
In a line amplifier ease of adjustment is very essential. The two usual adjustments required are the microphone controls and a control for regulating the output of the amplifier.

The amplifier is usually designed to take a number of microphones and is provided with the necessary switches for cutting them in or out of the circuit. In series with each microphone, a control is provided for regulating the intensity of that particular microphone. This is very essential when there are a number of microphones used at the same time because it may be desired to cut down the intensity of one while increasing the intensity of another. For example, when broadcasting a musical comedy, microphones are placed around the stage at various points and also in the orchestra pit. In order that the music of the orchestra shall not reach the broadcast listener louder than the singing from the stage, the intensity of the orchestra must be cut down. The microphone controls are usually adjusted at the beginning of a program and very rarely touched afterward.

The amplifier output regulator is manipulated constantly during a performance. The operator must so regulate the output that when a great volume of sound is suddenly impressed on the microphone it will not cause the amplifier to overload; or when the sound is very low it will not become too weak and fall under the line noise.

Tht output power is determined by a volume indicator. The volume indicator is a calibrated meter connected to a tube circuit across the line and indicates the amount of power fed into the line by the amplifier. The operator watches a needle on the volume indicator to prevent it from overshooting or falling below a given marking on the scale of the meter.

(*Turn to page 72*)



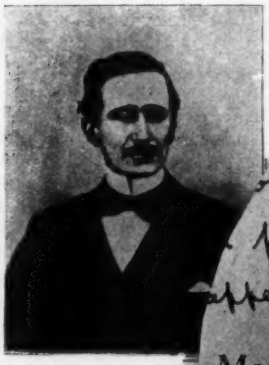
One type of line amplifier used for picking up events outside the regular broadcasting studio. To the left is the portable battery set and to the right is the amplifier set

THE OLD RECORD OF MARCONI'S FIRST RADIO SUCCESS

A record of experiments dating back to 1895 and 1899 that led to predictions which are just being realized today

By W. S. FITZPATRICK

Assistant Superintendent, Marine Department, Radio Corporation of America



Reprint of a page in The Wireless Age of January, 1915. Insert is photograph of Guglielmo Marconi taken at South Foreland Lighthouse, March 29, 1899

years past a great change
public opinion. This article
appeared in June, 1899.

Marconi's Wireless Telegraph.

Messages Sent at Will Through Space. — Telegraphing Without Wires Across the English Channel

By Cleveland Moffett

MR. MARCONI began his endeavors at telegraphing without wires in 1895, when in the fields of his father's estate at Bologna, Italy, he set up tin boxes, called "capacities," on poles of varying heights, and connected them by insulated wires with the instruments he had then devised—a crude transmitter and receiver. Here was a young man of twenty hot on the track of a great discovery, for presently he is writing to Mr. W. H. Preece, chief electrician of the British postal system, telling him about these tin boxes and how he has found out that "when these were placed on top of a pole two meters high, signals could be obtained at thirty meters from the transmitter," and that

South Foreland, the English station from which messages were sent without wires to Boulogne, France, thirty-two miles away. The mast supporting the vertical wire is seen on the edge of the cliff

*All the illustrations have been faithfully reproduced from the original articles

IN 1899 Cleveland Moffett wrote about Marconi's first experiments with wireless telegraphy. The success of these early experiments heralded the beginning of an era that we have come to know—to-day—as radio.

The article was reprinted in THE WIRELESS AGE, January, 1915. It was at that time considered to be of value, historically, in direct contrast to public opinion of 1899, at which time the idea of wireless telegraphy was something of a dream—an absurdity—a thing far beyond the realm of possibility despite the fact that Cleveland Moffett faithfully recorded Marconi's actual work and the results.

It is significant that Moffett recorded in his article, an interview with Marconi's chief engineer, in which the latter predicted directional transmission of messages. This was 1899. When the article was reprinted in 1915, the accomplishment had not yet passed the experimental stage. Today it is actually within our grasp. The chief engineer then told Moffett that it was a matter of speculation, but it was nevertheless his opinion that the future would bring forth a system by which ships could be steered by wireless. This had not yet been realized in 1915. Today it stands as an accomplished fact.

A prediction made in 1899, founded on the first experiments in wireless telegraphy, and now an accomplished fact, must surely have a foundation, a background of some interest to us in this day when we are much too prone to take things for granted.

Guglielmo Marconi's first attempt to telegraph without wires was made in 1895. His crude transmitter and receiver consisted of tin boxes called capacities, which he mounted on poles of varying heights and connected them by insulated wires with instruments he had then devised. With this equipment, Morse signals were obtained from 300 to 1,500 feet distance.

In 1896, Marconi came to London and conducted further experiments. Then came the signals on Salisbury Plain through house and hill; plain proof for doubters that neither brick walls nor rocks nor earth could stop these subtle waves. What kind of waves they were Marconi did not pretend to say; it was enough for him that they did their business well. And since they acted best with wires supported from a height, a plan was conceived of using balloons to hold the wires, and March, 1897, saw strange doings in various parts of England; ten-foot balloons covered with tinfoil sent up for "capacities" and promptly blown into slivers by the gale; then six-foot calico kites with tin-foil over them and flying tails; finally tailless kites, under the management of experts. In these trials, despite unfavorable conditions, signals were transmitted through space between points over eight miles apart.

In November, 1897, Marconi rigged up a stout mast at the Needles on the Isle of Wight, 120 feet high, and supported a wire from the top by an insulated fastening. Then, having connected the lower end of this wire with a transmitter, they put out to sea in a tugboat, taking with them a receiving instrument connected to a wire that hung from a sixty-foot mast. Their object was to see at what distance from the Needles they could get signals. For months, through storm and gales, they kept at this work. leaving the Needles farther and farther behind them as details in the instruments were improved, until by the New Year they were able to get signals clear across to the mainland. Forthwith a permanent station was set up there—first at Bournemouth, fourteen miles from the Needles, but subsequently moved to Poole, eighteen miles.

Let us come now to the Kingstown regatta, which took place in July, 1898. and lasted several days. The *Daily Express* of Dublin set a new fashion in newspaper methods by arranging to have these races oberved from a steamer, the *Flying Huntress*. A height of from seventy-five to eighty feet of wire was supported from the mast, and this was found sufficient to transmit easily to Kingstown, even when the steamer was twenty-five miles from shore. The receiving-mast erected at Kingstown was 110 feet high. and the

dispatches as they arrived here through the receiving instrument were telephoned at once to Dublin. During the regatta more than 700 of these wireless messages were transmitted.

Not less interesting were the memorable tests that came a few days later, when Marconi was called upon to set up wireless communication between Osborne House, on the Isle of Wight, and the royal yacht, with the Prince of Wales aboard, as she lay off in Cowes Bay. The Queen wished to be able thus to get frequent bulletins in regard to the Prince's injured knee, and not less than 150 messages were transmitted in the course of sixteen days, with entire success.

The transmission here was accomplished in the usual way—with a 100-foot pole off Ladywood Cottage, in the grounds at Osborne House, supporting the vertical conductor, and a wire from the yacht's mast lifted eighty-three feet above deck. This wire led down into the saloon, where the instruments were operated and observed with great interest by the various members of royalty aboard.

On one occasion the yacht cruised so far west as to bring its receiver within the influence of the transmitter at the Needles, and here it was found possible to communicate successfully with that station and with Osborne, and this despite the fact that both stations were cut off from the yacht by considerable hills, one of these, Headon Hill, rising 314 feet higher than the vertical wire on the Osborne.

Marconi realized, of course, the desirability of being able in certain cases to transmit messages in one and only one direction. To this end he conducted a special series of experiments with a sending apparatus different from that already described. He used no wire, but a Righi oscillator placed at the focus of a parabolic copper reflector two or three feet in diameter. The waves sent out by this oscillator were quite different from the others, being only about two feet long, instead of three or four hundred feet, and the results were less important than those obtained with the pendant wire. Still in trials on the Salisbury Plain, he and his assistants sent messages perfectly in this way over a distance of a mile and three-quarters, and were able to direct these messages at will by aiming the reflector in one direction or another.

In December, 1898, the English Lightship service authorized the establishment of wireless communication between the South Foreland Lighthouse at Dover and the East Goodwin lightship, twelve miles distant; and several times warnings of wrecks and vessels in distress reached shore when, but for wireless nothing of the danger would have been known. One morning in January during a week of gales, Mr. Kemp, then stationed at the South Foreland lighthouse was awakened at five o'clock by the receiver bell, and got word forthwith that a vessel was drifting on the deadly Goodwin Sands, firing rockets as she went. At this moment there was so dense a fog bank between the sands and the shore that the rockets could never have been seen by the coast-guards. They were, however, informed of the crisis by telegraph, and were able to put out at once in their life-boats.

Another application of wireless telegraphy that promised at that time to become important was the signaling of incoming and outgoing vessels. This, of course, is a fact today.

We come now to that historic week at the end of March, 1899, when the system of wireless telegraphy was put to its most severe test in experiments across the English channel between Dover and Boulogne.

During the several days that the trials lasted, representatives of the French Government visited both stations, and observed in detail the operations of sending and receiving. Senatore Marconi himself and his chief engineer, Mr. Jameson Davis, explained how the installations had been set up and what they expected to accomplish.

At five o'clock on the afternoon of Monday, March 27, everything being ready, Marconi pressed the sending key for the first cross-channel message.

"Brripp — brripp — brrrr — brripp — brrhh," went the transmitter. The sparks flashed and a dozen eyes looked out anxiously upon the sea as it broke fiercely over Napoleon's old fort that rose abandoned in the foreground. Would the message carry all the way to England?

"Brripp"—So he went, deliberately, then he stopped, and the room was silent, with a straining of ears for some sound from the receiver. A moment's pause, and then it came briskly. First "V" the call; then "M," meaning "Your message is perfect" then "Same here 2 c m s. V V V," the last being an abbreviation for two centimeters and the finishing signal.

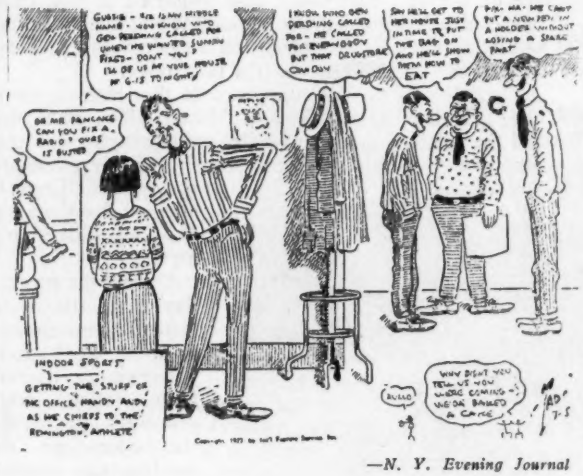
And so, without more ado, the thing was done. They might stare and chatter as they pleased, here was something come into the world to stay.

Chicago Examiner
The World
EVENING EDITION
ST. LOUIS POST-DISPATCH
EDITORIAL SECTION
PASSENGERS ON SPEEDING TRAIN TO READ NEWS OF WORLD FLASHED TO THEM BY WIRELESS

Photograph of front pages of newspapers dated 1905

LAUGHS IN RADIO

INDOOR SPORTS **BY TAD**


GUESS - HIS MIDDLE NAME - YOU KNOW WHO GOD PERSONALLY CALLED FOR WHEN HE WANTED JUNIOR FIRST - DON'T YOU ?
I'LL BE AT YOUR HOUSE AT 6:15 TO-NIGHT
I KNOW WHO GOD PERSONALLY CALLED FOR - HE CALLED FOR RUSSIAGODDY BUT THAT DOESN'T COUNT
SAY HELL GET TO HIS HOUSE JUST IN TIME TO PUT THE BAND ON AND HE'LL SHOW THEM HOW TO EAT
OH MR. PANCAKE CAN YOU FIX A RADIO ? ONE IS BUSTED
INDOOR SPORTS
GETTING THE STUFF OF THE OFFICE HANDY AWAY AS HE CHEERS TO THE REMINGTON ATHLETE
BUZZ
WHY DIDN'T YOU TELL US YOU WERE COMING ? WE'D BAKED A CAKE

—*N. Y. Evening Journal*

WHEN A FELLER NEEDS A FRIEND **BY BRIGGS**

JOHNNY KNOWS HE'LL HAVE TO GET UP AND TAKE OUT THE TUBE AND PUT IT AWAY AND FIX THE SWITCH AND CONNECTIONS AFTER PA AND MA GET THROUGH LISTENING TO GRAND OPERA. IT'S ALL OFF IF HE SHOULD FALL ASLEEP. PA AND MA DON'T KNOW ANYTHING ABOUT RADIO -- YOU CAN'T TRUST 'EM
Yow-oo-
Yoop - Yoop

—*N. Y. Herald-Tribune*

When the Senate Proceedings Are Broadcast

By James J. Montague.
(In the New York Herald-Tribune)

Hush my dear, lie still and slumber,
Dry those trembling pearly tears.
Senate speeches without number
Soon shall fall upon your ears.
Lay aside your pretty doll it
Needs to sleep as well as you;
Messers. Borah and La Follette
Now will speak an hour or two.

Let those eyelids no more flutter,
In your little crib relax,
Mr. Wadsworth now will utter
Words about the income tax.
Hear those accents so caressing,
Falling softly through the air,
Mr. Walsh is now addressing
Several motions to the chair.

Hush, my dear, lie calm and quiet,
Smooth the furrow from your brow,
That is not a fight or riot,
Mr. Heflin's talking now.
Fret not at the curious squeaking,
There's no trouble with the coil,
That is Mr. Wheeler speaking
On Republicans and oil.

Hush, my dear, lie still and slumber,
As these voices fall and rise,
Drowsiness will soon encumber
Those poor, tired, little eyes.
As the speeches roll and thunder,
You will sleep, dear little elf,
If you don't why you're a wonder—
I can't keep awake myself!

CUPID'S Q'S

"QRA?" accosted he.
"Tell me truly, QRD?"
"QRT," responded she.
"I'm not handling QSV."

"QTC?—a kiss or two?"
"Nil," she QRU.
Father's calling out CQ—
QRX, I'll QSU."

"QRM?" he queried when
They were QSO again.
"No," she murmured, "but just then
There was awful QRN."

—C. H. Berry, *Life*.

THEN AND NOW

Then

When I was young and an awful sap,
I took great pleasure in my open gap,
And after the manner of little boys,
I sure enjoyed that awful noise.
For my decrement was high
And my wave was low
(Between two hundred and a thousand or so).
My best DX was just a hundred flat
(An awful fluke it was at that),
For my note was rotten and my sending raw,
I had no license 'cause there was no law.

Now

I've four little tubes lined up in a row
(When you hit the key the plates all glow);
The wave is sharp as a surgeon's knife
And never interferes (except with the wife).
The juice is filtered, the note is fine
(That clear, ear-ticklin' CW whine).
Tho, my wave and power aren't very hi,
Still I've a regular schedule with PCII.

—*2FU, Amateur Radio.*

THE NEBBS—AND HE BOUGHT IT FOR JUNIOR **BY SOL HESS**

DADDY BOUGHT HIS LITTLE SON A RADIO SET— JUST A COUPLE WIRES AND THIS LITTLE MACHINE COAXES BEAUTIFUL MUSIC RIGHT INTO THE HOUSE THROUGH WALLS AND EVERYTHING
YES SIR, JUNIOR, THIS IS A WONDERFUL WORLD WHEN YOU CAN SIT IN YOUR HOME AND HEAR PEOPLE TALKING, PLAYING AND SINGING MILES AWAY
AND ONE OF THESE DAYS SOME SMART FELLOW IS GOING TO INVENT A MACHINE THAT CAN TELL WHAT YOU'RE THINKING ABOUT AND THAT WILL BE TOUGH FOR SOME OF THESE DECEITFUL GUYS THAT TELL YOU ONE THING AND MEAN SOMETHING ELSE
NOW, JUNIOR, I GOT IT TUNED IN — YOU COULD HEAR THE HEART BEAT OF A GNAT — IF A MOSQUITO WALKED ON THE WIRE IT WOULD SOUND LIKE A FELLOW WITH WOODEN SHOES DOING A CLOG DANCE IN A TUNNEL
LET ME LISTEN, PAPA
W.A. Nelson

—*N. Y. American*

THIS BATTERY WILL MATERIALLY REDUCE YOUR OPERATING COSTS ON HEAVY CURRENT SETS

NEW!

Eveready Heavy Duty "B" Battery. 45 volts. Three Fahnestock Clips. Length, 8 5/16 inches; width, 4 5/16 inches; height, 7 5/16 inches; weight, 13 3/4 pounds.

New low price, $4.75

New Heavy Duty 45-volt "B" Battery No. 770

Extra Large Cells— Extra Long Service

FOR maximum "B" Battery economy, use this *New Eveready Heavy Duty* 45-volt "B" Battery, in the following general cases:

1—On all receiving sets operating at 90 volts or more, having four tubes without a "C" Battery, and all sets having five or more tubes, with or without a "C" Battery.

2—On all power amplifiers.

3—On all sets that pull heavy currents from the "B" Battery.

Under the above conditions, the *New Eveready Heavy Duty* 45-volt "B" Battery will give much longer service than the 45-volt "B" Battery of usual size.

If your receiving equipment falls under any of the above classifications, you can make a big saving in "B" Battery costs by using this *New Eveready Heavy Duty* 45-volt "B" Battery No. 770. Buy it and you get the biggest battery value on the market to-day!

Manufactured and guaranteed by
NATIONAL CARBON COMPANY, INC.
Headquarters for Radio Battery Information
New York—San Francisco
Canadian National Carbon Co., Limited, Toronto, Ontario

No. 7111
Eveready Radio "A" Dry Cell
Specially manufactured for use with dry cell tubes

Eveready 6-volt Storage "A" Battery

No. 772
Vertical 45-volt, large size "B" Battery

No. 766
Eveready "B"
22½ volts. Six Fahnestock Spring Clip Connectors

No. 771
Eveready "C" Battery
Clarifies tone and prolongs "B" Battery life

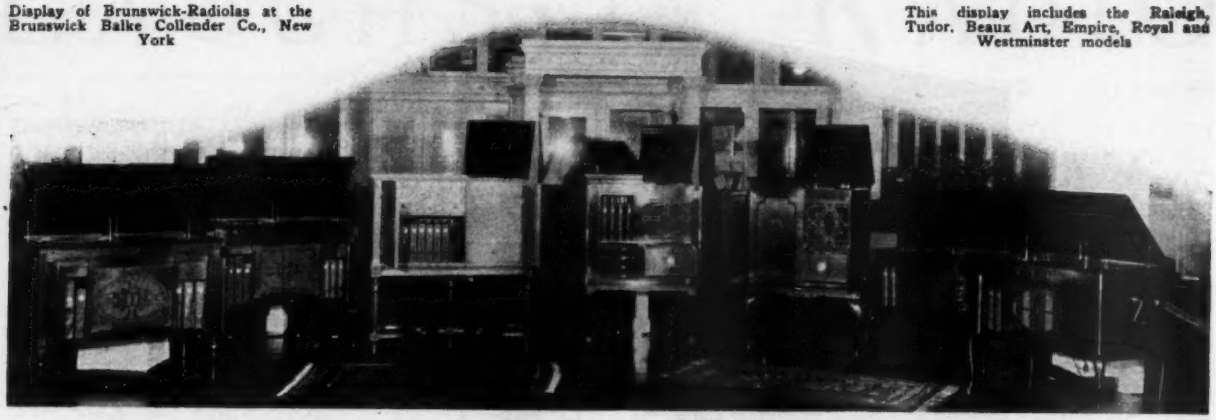
No. 764
Vertical 22½-volt "B" Battery

EVEREADY
Radio Batteries
—they last longer

"Quality Goods for Quality Readers"

Display of Brunswick-Radiolas at the Brunswick Balke Collender Co., New York

This display includes the Raleigh, Tudor, Beaux Art, Empire, Royal and Westminster models



RADIOVIEWING THE INDUSTRY

ISOLANTITE, an insulating material of exceptional merit, prior to this used exclusively in high tension work, has finally entered the radio field.

The De Forest Telephone & Telegraph Co. and the General Instrument Corporation and several others are now using Isolantite as insulating material.

Isolantite possesses extreme high surface resistance, high volumetric resistance and low high-frequency dielectric loss. Its dielectric strength is more than 14,000 volts per millimeter. It has a negligible phase angle. Isolantite is of a hardness only equaled by that of semi-precious stones. Its mechanical strength is on a par with brass, permitting a pressure-load of 37,000 pounds to the square inch.

An important feature is its resistance to high temperature, being unaffected by temperatures which affect high speed steel. Heat tests of 2700 degrees Fahrenheit were without effect.

Isolantite is a chemical unity, absolutely homogeneous, non-porous and non-absorptive, and contains no voids of any kind whatsoever.

One of its characteristics, not found in other insulating materials, is that it does not contain any included gases.

Vitally insulated parts are reduced in their effectiveness if the insulating material is porous and absorbent. Such condition causes decrease in surface and volumetric resistance and thereby lowers the leakage path resistance and minimizes the value of such insulation. The use of Isolantite thus will in itself lower the losses in radio apparatus and thereby increase the efficiency of the set in which it is used.

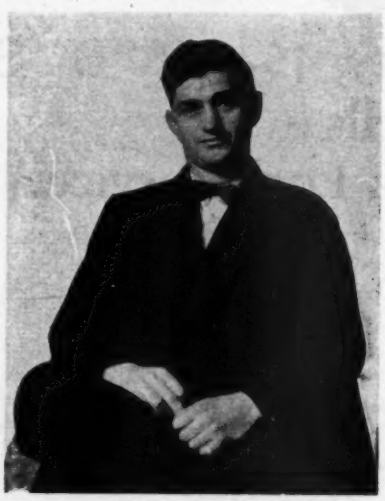
Isolantite is the result of a very exhaustive series of technical researches, carried out in Europe, which were based on the desire to produce an insulator which possessed all of the best qualities of any known form of insulation and none of their defects; combined in one single product.

The process of the manufacture of Isolantite, while covered by basic patents, remains to a great extent a carefully guarded secret.

The process is quite similar to the manufacture of steel and, in fact, represents in its field the same basic advance that the development of the steel process was to the old wrought-iron industry.

THIS MONTH

New Insulation—Radio in Prisons — More Expositions — Industrial Notes



Sidney E. Finkelstein started in the business world by selling Bruno Engravings on a salary of $10.00 a week. He has rapidly risen to position of field sales manager with that Company.

WORD comes from the Willard Storage Battery Company that a warden of a middle western state penitentiary has refused a Willard dealer the right to donate a storage battery to a prisoner. This warden adds that the set in question had been built without permission of prison authorities and that all radio sets in the institution might be ordered out any day. He doubted the wisdom of giving any convict the privilege of having an ethereal door opened to the world he had lost.

Was the warden right? Had you been warden, what would your reply have been?

THE design and layout of the All British Radio Exhibition at the Royal Albert Hotel, London, is an elaborate tribute to radio. The general color scheme is dark blue and gold, the booths are arranged in hub fashion, and retiring places for private chats are provided.

A RECORD transcontinental test for receiving long distance messages by radio on a moving train, was made by F. A. D. Andrea, radio manufacturer who arrived in Chicago on the Broadway Limited of the Pennsylvania R. R. from New York, and left on the San Francisco Overland Limited via the Chicago & North Western Railway. Union Pacific, Southern Pacific.

The receiver on both trains was installed in a private drawing room of the train, rather than in the club or observation car. The antenna installed on both the Broadway Limited and the San Francisco Overland Limited consisted of weather proof copper wires running lengthwise on each side of the Pullman car, being fastened through metal clips soldered to the ventilator into the drawing room. The radio received for 3,000 miles over the mountains and plains.

THE Electrical and Radio Exposition to be held at Springfield, Mass., October 27 to November 1, will be a creditable affair to that section of New England. There will be concerts every afternoon and evening by a well known orchestra.

Metropolitan stars have been engaged to provide entertainment. Electrical streamers will be used to decorate the exterior of the Auditorium. The façade of the structure will be flood lighted by two large searchlights. There will be a cooking school conducted by the management with daily demonstrations and lectures from 2:30 to 4:30. For the interest of radio fans there will be broadcasting direct from the Auditorium and practical demonstrations of receiving sets, both inside and outside antennas.

ALONG with this is the formation of a selling organization by the Yaxley Manufacturing Company. This company is splendidly equipped for manufacturing radio devices. Designing and production work is under the personal supervision of Earnest E. Yaxley, president of the company, and for many years identified with the invention and development of telephone equipment.

THE U. S. Tool Company have created a neat bit of publicity material in their new display board. It is not only striking and attractive, but compels public attention.

(*Turn to page* 90)

$26.00

Build It With The ULTRADYNE KIT

Now, the famous Ultradyne Receiver has been so simplified that anyone can successfully build it with the Ultradyne Kit.

This Kit includes all the special parts required to build the Ultradyne, designed by R. E. Lacault, the inventor—1 Type "A" Ultraformer, 3 Type "B" Ultraformers, 1 tuning coil, 1 oscillator coil, 4 matched fixed condensers.

The Ultradyne incorporates the new "Modulation System"—a decided departure from the detector arrangement of radio reception used in all other Super-Heterodynes. This "Modulation System" is the latest development of R. E. Lacault, A. M. I.R.E., Consulting Engineer of this company and formerly Radio Research Engineer with the French Radio Research Laboratories.

Even Super-Heterodyne Engineers marvel at Ultradyne performance —its unusual selectivity and great range on the loud speaker.

There is no greater receiver! Now you can build it yourself!

Write for descriptive folder

PHENIX RADIO CORP.

3-5 BEEKMAN STREET NEW YORK CITY

To protect the public, all genuine Ultraformers bear Mr. Lacault's personal monogram seal (R. E. L.) and are guaranteed so long as this seal remains unbroken.

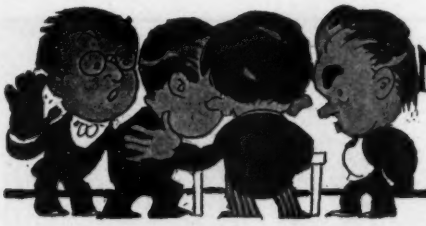
Send for 32-page illustrated book, giving latest authentic instructions on drilling, wiring, assembling and tuning 6 and 8 tube Ultradyne receivers.

50¢

ULTRADYNE

The Improved

SUPER-HETERODYNE



NEW APPLIANCES AND DEVICES

"Crofoot" Variable Condenser

THE Premier Electric Company, Chicago, has developed a new variable condenser known under the trade name "Crofoot," which is said to have an extremely low minimum capacity which greatly increases its tuning ratio.

As an illustration of the extremely low minimum capacity and high tuning ratio, the "Crofoot" having a maximum or full-in capacity of .000516 M.F., has a minimum or full-out capacity of .000007 M. F., which gives the extremely high tuning ratio of 1 to 74, which advantage is appreciated in extremely critical hook-ups. In addition to this advantage, it has a very low phase angle loss, which is 1/12 of 1 degree.

This condenser is of the so-called "low-loss" design and has extremely high dielectric or insulation resistance, for it employs hard rubber in the very small cross-sectional area as insulator of the rotor and stator groups.

The entire condenser is made of hard brass and is beautifully finished in the generally accepted requisites of a good condenser. In addition to the low minimum capacity and high tuning ratio aforementioned, we find in the "Crofoot" that the rotor and stator plates are of heavy gauge brass and are all electrically connected by soldered connections. These stator and rotor plates are of a semi-straight line plate design which makes tuning easy and accurate.

The very unique identification which seems to have been invented along with the other features of "Crofoot" by the Premier Electric Company in its slogan "With the Red Stripe" for the condenser has the soldered connections of the stator and rotor plates

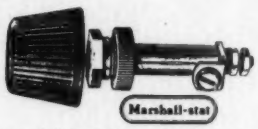
"Crofoot" Variable Condenser

covered with a brilliant red varnish, so that the fan will know that the Premier "Crofoot"—"With the Red Stripe" means that the rotor and stator plates are soldered.

This company, in addition to the "Crofoot" Condenser, are manufacturers of the Premier "Hegehog" Audio Frequency Transformers; "Lo-Loss" Tube Socket; Microstat; Duostat; Double Disconnect Potentiometer; and Universal jacks and plugs—and any dealer desiring information from the factory, simply has to write or call and they can be sure of the most courteous consideration and attention.

Marshall-Stat, a Universal Rheostat

THE Marshall-Stat is the newest "accurate adjustment" rheostat on the market. Specially treated Marshall resistance discs said to be far stronger mechanically than any discs heretofore used, enable the

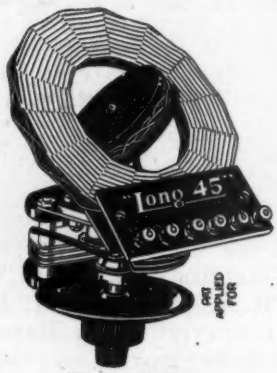


Marshall-Stat Universal Rheostat

operator to obtain any resistance down to the finest vernier adjustment for any tube or combination of tubes. Breakage of discs is impossible.

The Marshall-Stat has only two terminals Consequently there can be no confusion in making connections. Requires only one hole in panel and is very compact.

Entirely enclosed in metal; nickel-plated.



"Long 45" Tuner

"Long 45" Tuner

THE "Long 45" Approved Tuner efficiently combines a seven-plate variable condenser with stationary and rotating inductance coils in one neat unit.

With this "Long 45" creation and a little additional apparatus, many satisfactory hook-ups can be made by the radio enthusiast.

The terminal board with binding posts enables the user to readily attach this tuner to a socket, rheostat, etc., without the necessity of making soldered connections. This improvement permits the construction of receiving sets in the shortest possible time.

The small condenser is made possible by the low capacity in the inductance used, thereby gaining unusual efficiency in reception.

Lego Wonder

The Lego Wonder

A NEW fixed detector is being put out on the market by the Lego Corp. of 225 West 77th St. The engineers of this concern after months of experimentation maintain that the Lego Detector is ideal for Reflex anad Crystal sets.

The new detector has no parts to wear out, is said to be 100% sensitive, is enclosed in glass, withstands high voltages, is pleasing in appearance, and is fully guaranteed by the manufacturer.

Globe Headset

THE Globe Phone Mfg. Company, Reading, Mass., has developed and is putting on the market a new radio headset, at $5 list.

In the past the company has marketed two type headsets, list price $6 and $8, but because of the increasing popularity and growing demand for their products they report that they have been forced to increase production, with the result that it has seemed highly advisable to standardize on simply one type of headset which they will market under the name, "Globe."

This new headset is made with brass cases, with a high polish nickel finish, the back stamped with their trademark of the "Globe" design. Large moulded ear caps designed for comfort are used, and the headset is

Globe Headset

equipped with a specially designed, broad adjustable headband, russet leather covered. By means of a special connecting block the cord terminals are concealed within the case so no metal parts are exposed, thus doing away with any danger of a short circuit with the yoke of the headband. This headset is packed completely assembled in an attractive blue box with the standard Globe red label.

And Now All-American Brings You DISTANCE, VOLUME *and* QUALITY with *ONE TUBE*

Self-Tuned Radio Frequency Transformers —Wound to Suit the Tube

OUT of a year of many experiments and numerous failures to achieve in a practical instrument the theoretical possibilities of broad-tuned Radio Frequency Amplifiers, has come a simple but far-reaching discovery. Radio Frequency Transformers can and must be *adapted to the characteristics of the particular vacuum tube* whose grid voltage they supply. That truth—with All-American scientific research and All-American precision manufacturing—has made radio history.

SELF-TUNED RADIO FREQUENCY TRANSFORMERS *have arrived*—and All-American, naturally enough, has brought them. Never before has an instrument been built which will amplify so effectively, over the entire radiocast range, as will the new All-American Types R-199 and R-201A. Together with the new Type R-140 All-American Universal Coupler, they have made possible a *new standard of efficiency* in Radio Frequency and Reflex receivers.

As an example of this, we offer ALL-AMAX JUNIOR (1 Tube) and ALL-AMAX SENIOR (3 Tube). Both are *All-American-coupled throughout*, and both exemplify the new standard of performance.

Build an ALL-AMAX—using the complete panel scheme and wiring plan shown in your KEY BOOK—and you will never go back to an ordinary reflex set. Distance and power are yours!

All-Americans—Precision-Made for Reliability

Sold by all the Better Dealers

Audio Frequency Transformers
"All-American for Reliability"

Ratio 3 to 1	R-12, $4.50
Ratio 5 to 1	R-21, 4.75
Ratio 10 to 1	R-13, 4.75

Built by Precision Methods in a Modern Plant, All-American Audios are Unsurpassed at any price for Quality Reproduction and Dependable Service.

Long Wave Transformer

For High Amplification and no distortion of side bands at 4,000 to 20,000 meters (75 to 15 Kilocycles) . . R-110, $6.00

Power Transformers

For Tone Quality in a Third Stage, or for Loud Volume with Clearness.

Input Type	R-30, $6.00
Output Type	R-31, 6.00

An absolutely new kind of book—immensely valuable to both beginner and expert.

ALL-AMAX JUNIOR *and* SENIOR; *also many other good hook-ups.*

Sent for 10 cents, coin or stamps.

RAULAND MFG. CO.
2674 Coyne St.
CHICAGO
Pioneers in the Industry

Radio Frequency Transformers
"Self-Tuned—Suited to the Tube"

Effectively amplifying all Frequencies within the Radiocast Range.

For "199" Tubes	R-199, $5.00
For "201A" Tubes	R-201A, 5.00

10,000 Meter Transformer

It gives superior results in beat reception, filtering out a 30 Kilocycle Frequency with high selectivity and no side-band distortion R-120, $6.00

Radio Frequency Coupler

(Oscillator Coupler.) A uniform output at 130 to 650 meters . . R-130, $5.00

Universal Coupler

Sets a new standard of efficiency as an antenna coupler. As a radio frequency transformer in tuned stages it is unsurpassed R-140, $4.00

ALL-AMERICAN
TRADE MARK

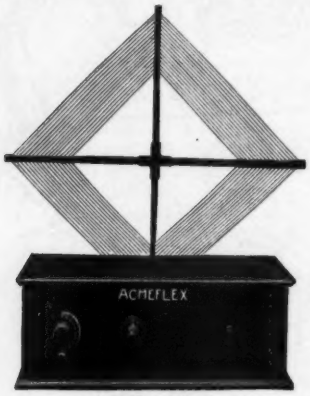
Largest Selling Transformers in the World

"Quality Goods for Quality Readers"

Acmeflex Kitset

WHEN a radio manufacturer proves the worth of his product he not only makes the best kind of apparatus but he also assists his customers in getting other good apparatus to be used with his own product.

The Acme Apparatus Company has done this to the limit. They have collected all of the parts, including fixed condensers, binding posts, screws, nuts, washers, etc., which go into a complete four tube Reflex set and put them out in kit form.



Acmeflex Kitset

This is the Acmeflex Kitset, which requires no solder and only two tools; a screw driver and a pair of pliers, for its complete assembly. Both these tools are included in the kit and in addition there are two full sized drawings showing just how to bend every wire and where to put it.

A drilled bakelite panel and baseboard which fit a standard cabinet complete the set while the parts for a good loop, which are also included, complete the kit.

Carter "One-Way" Plug

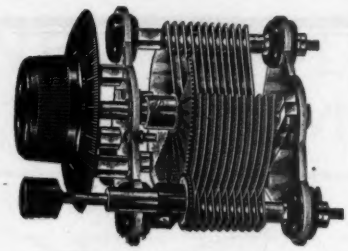
THE Carter Radio Company, 1802 Republic Bldg., Chicago, has originated a new plug for use with head phone or loud speaker. No screws are used, the cord tip is pressed between long heavy phosphor-bronze springs making contact the entire length of the tip. There is no chance for short circuiting, as Bakelite insulation is used throughout and the terminals cannot

Carter "One-Way" Plug

twist together. Body capacity is entirely eliminated. The plug which retails for fifty cents is of the same high grade material and workmanship as the Carter "Tu-Way" Plug which is so well known.

Heath Radiant Condenser

THE fundamental distinction between Heath Radiant Condensers and other condensers consists of the process of stamping and tempering rotor plates to a point which the inventor claims makes it absolutely impossible for these plates to warp. Another Heath feature is the micrometer geared vernier. This adjustment is entirely



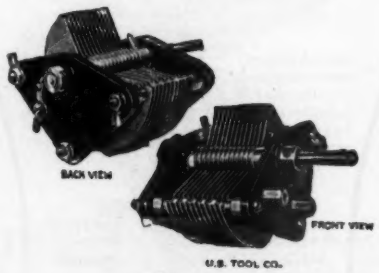
Heath Radiant Condenser

separate from any other adjustment on the condenser and is primarily a fine reducing gear, meshing directly into teeth cut into the outer rim of the vernier plate. This vernier is naturally very delicate and positive.

Recently, they have brought out a new type which they call "Non-Dielectric, Metal End Plate Radiant Condenser." This type is all metal, except for the small bushings of hard rubber inserted in the aluminum end plates to insulate the rotor from the stator plates. Grounding these end plates entirely eliminates the former difficulties with dielectric losses and capacity effects. It furthermore obviates the necessity of shielding. Every new Heath condenser type is tested by recognized testing laboratories before it is placed on the market. Excellent reports were received on this new type. The New York Testing Laboratories found an equivalent series resistance of only 0.1 Ohm and a phase difference of less than one minute.

U. S. Tool Company, Inc.

IN addition to the two already familiar types, and with the ever ready desire to provide the general buying public with variable condensers of quality at lowest possible prices, the U. S. Tool Company will offer to the trade, four new types, which when seen, will be immediately recognized as radio material of the highest order.

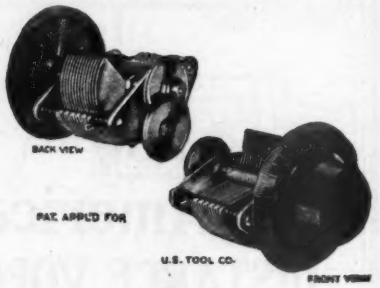


Type 3

Type No. 3 is equipped with pigtail, one end soldered to the shaft, the other end soldered to a double ended continuous soldering clip, making a positive connection. The pig tail is protected on the shaft by a half bobbin. Three (3) mounting lugs with three (3) flat head screws are also supplied. Mechanically, this is the correct way to mount a condenser—it divides the strain placed upon the panel. Two (2) soldering clips are provided for the stator connection, one at each side, and on the rear end plate. These two clips permit of making stator connection from either side, without having to change position of clips.

The capacity will not vary, plus or minus, three per cent. from that indicated.

Type No. 4 is equipped with Kurz-Kasch 3¾" dial and 2¼" knob. This standard equipment has been used in order that like and similar dial equipment may be pur-



Type 4

chased for other parts, thereby permitting of a more sightly panel appearance.

The capacities of Type No. 4 considered as standard, will be the same as for Type No. 3.

The Red Seal Map-Loop Aerial

THE Red Seal Map-Loop, made by Manhattan Electrical Supply Co., Inc., is a highly efficient loop, having sufficient wires to cover the broadcasting wave range length with a variable condenser of .0005 M. F. capacity.

The frame and base are of handsome appearance. The wire is concealed behind a most unique map, having a list of all the principal broadcasting stations in the United States.

The Map-Loop, combining as it does the utilitarian purpose of the loop with the artistic vogue for old maps for decorative purposes, is an addition to even the most tastefully furnished homes.

The convenience of having easily accessible the combination of a radio map of the United States with a list of broadcasting

Red Seal Map-Loop Aerial

stations will be appreciated by all, as, perhaps, nothing so impresses the listener to a distant station as the visual representation of the distance covered.

A feature of the Map-Loop is a scale on the base on which can be marked the position in which the loop must be pointed to receive any given station.

Connection to the receiving set is made to the base on which the loop turns.

Exact Size Cut of the Marshall-stat

Marshall-stat

Do You Want to Hear More Stations?

Getting more stations with the equipment which you have is largely a matter of adjustment on your tubes.

Then why not use the smoothest accurate-adjustment rheostat you can get—the Marshall-stat?

You will find in the Marshall-stat a means of obtaining any desired adjustment with absolute precision. The Marshall-stat varies the resistance, not step by step, but smoothly, continuously, and uninterruptedly from zero to maximum.

The Marshall-stat provides vernier precision throughout its entire range. Yet, there is only one knob to manipulate—no troublesome double adjustment to make.

It brings new stations to your receiving set and clears up for you the stations which you hear only occasionally and at those times indistinctly.

Without having to drill additional holes, any one can install Marshall-stats in his receiving set, whether it is home-made or factory made. And wherever Marshall-stats are used, the pleasure and fun of radio are enormously increased.

ADVANTAGES of the Marshall-Stat

Requires only one hole in panel. Can be inserted in hole from which old rheostat is removed.

Vernier all the way—but only one adjustment to make.

Only two terminals. Connections cannot be made incorrectly.

Can be used with any tube or combination of tubes.

Compact in size. (Note full size cut above). Takes up very little space. Can be fitted anywhere.

Working parts entirely enclosed in nickel-plated chamber.

Knob can be replaced with the knob of your set. Only one special screw (furnished at nominal extra charge) needed to make change.

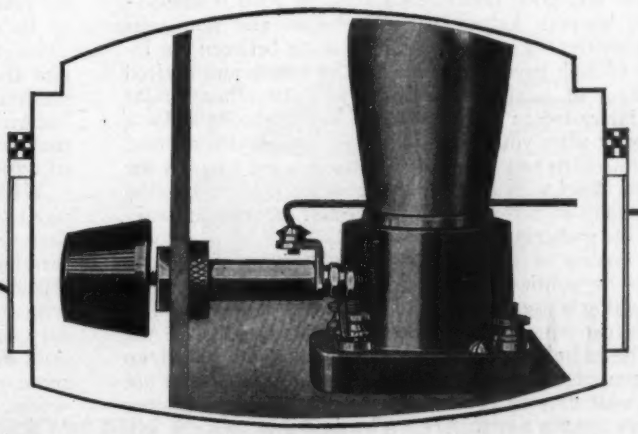
Discs made of specially-treated material which is the result of years of experimental and research work by radio and electrical engineers. Are absolutely uniform throughout.

Mechanical construction and proportions of discs are such that breakage is impossible.

Price $1.75

MARSHALL ELECTRIC COMPANY

3239 Locust Boulevard **Saint Louis, Missouri**



Send for Old Man Ohm's descriptive folder on the Marshall-stat.

THE IDEAL RHEOSTAT FOR ALL TUBES

"Quality Goods for Quality Readers"

Our Social Edifice—*By Dwight F. Davis*

(*Continued from page* 21)

really more and perhaps with more serious thought and attention than those in the cities. There are not so many distractions in the former surroundings as in the latter. The country inhabitants may not know the baseball scores and standings so accurately, but they may have studied the party platforms most carefully and may know quite thoroughly what their candidates stand for. The radio may have a great influence in creating a real *voting* interest which has always been desirable in the rural sections and which for many reasons, sometimes good ones, has not been as fully expressed as would be best for the common weal. Any one who has either lived in the country or even visited there for ever so short a period knows that the arrival of the daily paper is an event to be awaited anxiously, and that upon its arrival the contents of the paper are thoroughly digested. Therefore, I say, that without the figures as to the actual sales of receiving sets before one, giving the distribution of the sales as between the city and country sections, it is difficult, along with all the other factors in the case, to say whether the influence of radio will be greater in a political campaign in the rural districts or in the cities. Of this we can be sure, that wherever there is a set it will be in use whenever there is anything worth while along the line of politics in the next four months to be heard.

Radio, great though its inroads has been and will continue to be, can hardly take the place entirely of the mass meeting. The aural sense is not yet the one most used by human beings. People like to *see*. They especially like to see other men. They particularly want to see who is running for office, the men to whom they are to give their suffrages. This, I think, is a very human trait and one very generally held. There may come a time when the ear will mean as much to the race as the eye, but one must conclude that the reverse is now a fact. And politics must take account, like all human activities, of the facts in the case. Therefore political meetings are still in order. They are, moreover, necessary. Organizations in order to function best must have instilled in their members that proper enthusiasm which produces results when nothing else will. Men and women can be made to feel themselves a part of an organization dedicated to some good cause by personal association as by no other means. Witness the many hundreds of annual meetings of societies of teachers—and good politicians should be good teachers—doctors, lawyers, lodges, patriotic bodies and numerous other activities. I am here distinguishing between the influence of mob psychology and the legitimate and desired advantages of getting acquainted with the other similar spirits interested in the same cause. You should know a man better after you have shaken his hand and conversed with him. Men and women like to do this and I hardly see now how radio, with all its manifest advantages can take the place wholly of this personal touch and association available in the gathering.

The quality of offerings by candidates and their proponents in politics must inevitably be improved when broadcasting is used. Abuse and rant will not get by. The passions can not be effectively played upon through the air. The radio speaker has no way of knowing to whom he is speaking, and therefore he must be very careful not to say what may be construed as disrespectful to another candidate or his supporters. The personal element will to a great extent give way to the advocacy of principles and their adoption and enforcement, which will be a salutary change. Americans are charitable and they like to see everyone get a fair show; the radio broadcaster will get the best results if he confines himself to praise of his own candidates and principles and at the very most only criticism of his opponent's ideas.

I believe that in its educational features radio broadcasting will have a broad and deep influence hereafter in matters political. The late political conventions beyond the shadow of a doubt proved that. Many, many people remained on the receiving end as late as three in the morning to see how the candidates before the Democratic convention were faring. The American people understand as a result of the Cleveland and New York conventions better than ever how the machinery of these great national phenomena works. It is good that they do better understand, for through such intelligence only do we lay the foundations upon which the structure of a better social edifice can be built. With the proper use of knowledge comes a greater power, and with the leadership offered to the American people in this campaign, and with the facilities available, including new radio broadcasting, to this fine type of manhood striving for the positions of trust and opportunity for service, I can not but be confident that the nation is facing a better day in its already illustrious history.

Promoting International Understanding

By James J. Davis

(*Continued from page* 19)

sions by this means are not better qualified to judge of the sincerity and motives of the speaker and are not better able to separate the wheat from the chaff of the harangue of bitter political opponents than those who actually attend the meetings and caucuses. Usually a vast majority of attendants at a political meeting are of the same political faith as the speaker. They need no argument to support the speaker in his views; they are inclined that way naturally. They are perhaps not in a receptive mood for any other doctrine than that expressed. They may be carried away by the sentiment of an enthusiastic mob.

Not so is this true of the voter who remains at home from necessity or from choice and listens in to that same meeting. There is no personality, no cultured dramatic exhibition of oratorical powers. There is no influence from without which may sway the cool judgment of the listener as to the value of the speaker's words. There is no preference shown by the grantors of political favors in the distribution of tickets to hear the addresses of public men. The seats are free to all who care to listen and the proportion of listeners who may be of different political views is likely to be largely increased. Only by knowing and understanding both sides of an argument may one really be able to judge as to the force or strength of any one.

With other nations listening in to the expressions of our public men can we not hope to come to a more satisfactory understanding of each other's difficulties and aspirations? The thought expressed for the purpose of influencing our own people is more likely to be in sympathy with public feeling than the words of an individual emissary to a foreign land whether diplomatic or commercial. And so it seems to me we are binding ourselves not only more closely commercially to the other nations of the world, but more firmly in thought as well as in deed. While the ultimate effect of the use of radio facilities in expressing public thought can only be determined after we have given it a fair test, I predict that it will be no less a factor in promoting international understanding than has been the rapid growth of our physical transportation facilities.

19 IMITATIONS!

A RECORD COMPLIMENT

We have counted 19 imitations of our products. But the imitator cheats by offering the exterior likeness only. SCIENTIFIC ACHIEVEMENTS DEFY IMITATION. General Instrument Corporation eliminates and reduces losses in its condensers by scientific means available only to manufacturers with laboratory facilities equal to those of General Instrument Corporation.

Air, Isolantite, Pyrex, Corantum and Quartz are the only recognized zero or minimum loss insulations in existence.

GENERAL INSTRUMENT CORPORATION INSULATES WITH AIR, ISOLANTITE, PYREX, CORANTUM AND QUARTZ.

The embodiment of this scientific principle in General Instrument Condensers makes a certainty of GREATER DISTANCE, INCREASED SELECTIVITY AND CLEAR RECEPTION. By eliminating energy waste these genuine condensers overcome losses.

IMPORTANT: Pigtails introduce variable inductance and variable resistance, defeating accuracy and creating losses. The Bureau of Standards does not use pigtails on their standard variable air condensers. Neither does The General Instrument Corporation.

THE GENUINE

COST A LITTLE MORE BUT ARE

WORTH INFINITELY MORE

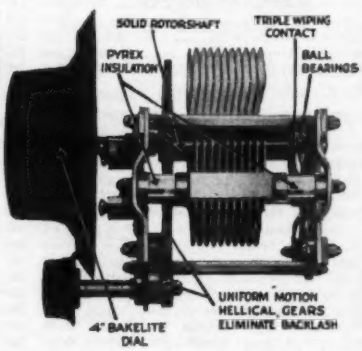
TYPE 52

NO LOSS

TYPE 51 TYPE 52

INSULATED WITH

PYREX



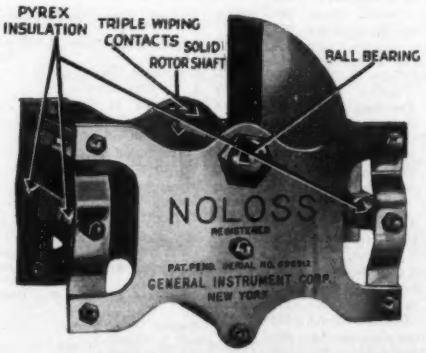
LOW LOSS

TYPE 46 TYPE 47

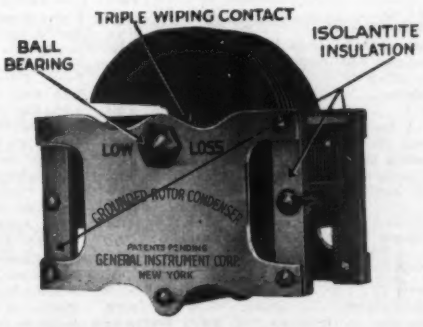
INSULATED WITH

ISOLANTITE

TYPE 51



TYPE 46



GENERAL INSTRUMENT CORPORATION

MANUFACTURERS OF LABORATORY EQUIPMENT

423 Broome Street, New York

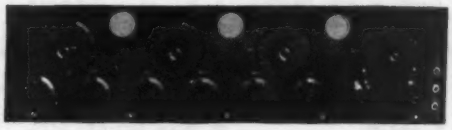
BROADCASTING STATION DIRECTORY

The Most Authentic, Up-to-the-Minute List of Stations Broadcasting in the United States, Canada, England, France and Cuba

KDKA	Westinghouse Elec. & Mfg. Co., E. Pittsburgh,Pa.	326
KDPM	Westinghouse Elec. & Mfg. Co., Cleveland, O.	270
KDPT	Southern Electric Co.....San Diego, Calif.	244
KDYL	Newhouse Hotel.....Salt Lake City, Utah	360
KDYM	Savoy Theater.....San Diego, Calif.	280
KDYQ	Oregon Institute of Technology, Portland, Ore.	360
KDZB	Frank E. Siefert.....Bakersfield, Calif.	240
KDZE	Rhodes Department Store.....Seattle, Wash.	270
KDZI	Electric Supply Co.....Wenatchee, Wash.	360
KDZR	Bellingham Publishing Co., Bellingham, Wash.	261
KFAD	McArthur Bros. Mercantile Co.....Phoenix, Ariz.	360
KFAE	State College of Washington....Pullman, Wash.	330
KFAF	Western Radio Corp.....Denver, Colo.	360
KFAJ	University of Colorado.....Boulder, Colo.	360
KFAR	Studio Lighting Service Co.....Hollywood, Calif.	280
KFAW	The Radio Den.....Santa Ana, Calif.	280
KFAY	Virgin's Radio Service.....Medford, Ore.	263
KFBB	F. A. Buttrey & Co.....Havre, Mont.	360
KFBC	W. K. Azvill.....San Diego, Calif.	278
KFBE	Reuben H. Horn.....San Luis Obispo, Calif.	242
KFBG	First Presbyterian Church.....Tacoma, Wash.	360
KFBK	Kimball-Upson Co.....Sacramento, Calif.	283
KFBL	Leese Bros.....Everett, Wash.	224
KFBS	Trinidad Gas & Electric Supply Co. and the Chronicle News, Trinidad, Colo.	360
KFBU	The Cathedral.....Laramie, Wyo.	283
KFCB	Nielsen Radio Supply Co.....Phoenix, Ariz.	238
KFCF	Frank A. Moore.....Walla Walla, Wash.	360
KFCP	Ralph W. Flygare.....Ogden Utah	360
KFCV	Fred Mahaffey, Jr.....Houston, Tex.	360
KFCZ	Omaha Central High Shool.....Omaha, Nebr.	258
KFDD	St. Michael's Cathedral.....Boise, Idaho	252
KFDH	University of Arizona.....Tucson, Ariz.	268
KFDJ	Oregon Agricultural College.....Corvallis, Ore.	360
KFDX	First Baptist Church.....Shreveport, La.	360
KFDY	South Dakota State College..Brookings, S. Dak.	360
KFDZ	Harry Q. Iverson.....Minneapolis, Minn.	231
KFEC	Meier & Frank Co.....Portland, Ore.	248
KFEK	Augsburg Seminary.....Minneapolis, Minn.	261
KFEL	Winner Radio Corporation.....Denver, Colo.	254
KFEQ	J. L. Scroggin.....Oak, Nebr.	268
KFER	Auto Electric Service Co.....Fort Dodge, Iowa	231
KFEV	Felix Thompson Radio Shop.....Casper, Wyo.	263
KFEY	Bunker Hill & Sullivan Mining & Concentrating Co., Kellogg, Idaho	360
KFEZ	Associated Engineering Societies of St. Louis, St. Louis, Mo.	248
KFFB	Jenkins Furniture Co.....Boise, Idaho	240
KFFE	Eastern Oregon Radio Co.....Pendleton, Ore.	360
KFFR	Nevada State Journal.....Sparks, Nev.	226
KFFV	Graceland College.....Lamoni, Iowa	286
KFFX	McGraw Co.....Omaha, Nebr.	278
KFFY	Pincus & Murphy.....Alexandria, La.	275
KFGC	Louisiana State University.....Baton Rouge, La.	254
KFGD	Chickasha Radio & Elec. Co., Chickasha, Okla.	248
KFGL	Snell & Irby.....Arlington, Ore.	234
KFGQ	Crary Hardware Co.....Boone, Iowa	226
KFGB	Heidbreder Radio Supply Co.....Utica, Nebr.	224
KFGX	First Presbyterian Church.....Orange, Tex.	250
KFGZ	Emmanuel Missionary Coll..Berrien Spgs., Mich.	286
KFHA	Western State College of Colo., Gunnison, Colo.	252
KFHH	Ambrose A. McCue.....Nesh Bay, Wash.	261
KFHJ	Fallon & Co.....Santa Barbara, Calif.	360
KFHR	Star Electric & Radio Co.....Seattle, Wash.	283
KFI	Earle C. Anthony (Inc.).....Los Angeles, Calif.	469
KFIF	Benson Polytechnic Institute.....Portland, Ore.	360
KFIO	North Central High School.....Spokane, Wash.	252
KFIQ	Yakima Valley Radio Broadcasting Association, Yakima, Wash.	242
KFIU	Alaska Elec. Light & Power Co., Juneau, Alaska	226
KFIX	Reorganized Church of Jesus Christ of Latter Day Saints, Independence, Mo.	240
KFIZ	Daily Commonwealth and Oscar A. Huelsman, Fond-du-Lac, Wis.	273
KFJB	Marshall Electric Co.....Marshalltown, Iowa	248
KFJC	Seattle Post-Intelligencer.....Seattle, Wash.	270
KFJF	National Radio Mfg. Co., Oklahoma City, Okla.	252
KFJI	Liberty Theater.....Astoria, Ore.	252
KFJK	Delano Radio & Electric Co.....Bristow, Okla.	233
KFJL	Hardaeay Manufacturing Co.....Ottumwa, Iowa	242
KFJM	University of North Dakota, Grand Forks, N. D.	280
KFJQ	Electric Construction Co., Grand Forks, N. Dak.	280
KFJR	Ashley C. Dixon & Son.....Stevensville, Mont.	256
KFJX	Iowa State Teachers College, Cedar Falls, Iowa	280
KFJY	Tunwall Radio Co.....Fort Dodge, Iowa	246
KFJZ	Texas Nat'l Guard, 112 Cav., Fort Worth, Tex.	254
KFKA	Colorado State Teachers' Coll....Greeley, Colo.	273
KFKB	Brinkley-Jones Hospital Assn., Milford, Kans.	286
KFKQ	Conway Radio Laboratories.....Conway, Ark.	250
KFKV	F. F. Gray.....Butte, Mont.	283
KFKX	Westinghouse Elec. & Mfg. Co., Hastings, Nebr.	341
KFKZ	Nassour Bros. Radio Co., Colorado Springs, Colo.	234
KFLA	Abner R. Wilson.....Butte, Mont.	283
KFLB	Signal Electric Mfg. Co.....Menominee, Mich.	248
KFLD	Paul E. Greenlaw.....Franklinton, La.	234
KFLE	National Education Service.....Denver, Colo.	268
KFLQ	Bizzell Radio Shop.....Little Rock, Ark.	261
KFLU	Rio Grande Radio Supply House, San Benito, Tex.	236
KFLV	A. T. Frykman.....Rockford, Ill.	229
KFLX	George B. Clough.....Galveston Tex.	240
KFLZ	Atlantic Automobile Co.....Atlantic, Iowa	273
KFMB	Christian Churches of Little Rock, Little Rock, Ark.	254
KFMQ	University of Arkansas.....Fayettesville, Ark.	263
KFMR	Morningside College.....Sioux City, Iowa	261
KFMT	George W. Young.....Minneapolis Minn.	231
KFMW	M. G. Satern.....Houghton, Mich.	286
KFMX	Carleton College.....Northfield, Minn.	283
KFNF	Henry Field Seed Co.....Shenandoah, Iowa	266
KFNG	Wooten's Radio Shop.....Coldwater, Miss.	254
KFNJ	Warrensburg Electric Shop....Warrensburg, Mo.	234
KFNL	Radio Broadcast Association..Paso Robles, Calif.	240
KFNV	L. A. Drake.....Santa Rosa, Calif.	234
KFNX	Peabody Radio Service.....Peabody, Kans.	240
KFNY	Montana Phonograph Co.....Helena, Mont.	261
KFNZ	Royal Radio Co.....Burlingam, Calif.	231
KFOA	Rhodes Co.....Seattle Wash.	455
KFOC	First Christian Church.....Whittier, Calif.	236
KFOD	The Radio Shop.....Wallace, Idaho	224
KFOJ	Moberly High School Radio Club, Moberly, Mo.	246
KFOL	Leslie M. Schafbuch.....Marengo, Iowa	234
KFON	Echophone Radio Shop.....Long Beach, Calif.	234
KFPB	Edwin J. Brown.....Seattle, Wash.	224
KFPT	Cape & Johnson.....Salt Lake City, Utah	360
KFQE	Dickenson-Henry Radio Laboratories, Colorado Springs, Colo.	224
KFQF	Donald A. Boult.....Minneapolis, Minn.	224
KFQY	Farmers State Bank.....Belden, Nebr.	360
KFSG	Echo Park Evangelistic Assn., Los Angeles, Calif.	278
KGB	Tacoma Daily Ledger.....Tacoma, Wash.	262
KGG	Hallock Watson Radio Service....Portland, Ore.	360
KGO	General Electric Co.....Oakland, Calif.	312
KGU	Marion A. Mulrony.....Honolulu, Hawaii	360
KGW	Portland Morning Oregonian.....Portland, Ore.	492
KGY	St. Martins College.....Lacey, Wash.	258
KHJ	Times-Mirror Co.....Los Angeles, Calif.	395
KHQ	Louis Wasmer.....Seattle, Wash.	360
KJQ	C. O. Gould.....Stockton, Calif.	273
KJR	Northwest Radio Service Co.....Seattle, Wash.	283
KJS	Bible Inst. of Los Angeles, Los Angeles, Calif.	360
KLS	Warner Bros. Radio Supplies Co., Oakland, Calif.	360
KLX	Tribune Publishing Co.....Oakland, Calif.	509
KLZ	Reynolds Radio Co.....Denver, Colo.	283
KMJ	San Joaquin Light & Power Corp., Fresno, Calif.	248
KMO	Love Electric Co.....Tacoma, Wash.	360
KNT	Walter Hemrich.....Kukak Bay, Alaska	263
KNX	Electric Lighting Supply Co., Los Angeles, Calif.	360
KOB	New Mexico College of Agriculture & Mechanic Arts, State College, N. Mex.	360
KOP	Detroit Police Department.....Detroit, Mich.	286
KPO	Hale Bros.....San Francisco, Calif.	423
KQP	Apple City Radio Club.....Hood River, Ore.	360
KQV	Doubleday-Hill Electric Co.....Pittsburgh, Pa.	270
KQW	Charles D. Herrold.....San Jose, Calif.	360
KRE	Berkeley Daily Gazette.....Berkeley, Calif.	275
KSD	Post-Dispatch .....St. Louis, Mo.	546
KTW	First Presbyterian Church.....Seattle, Wash.	360
KUO	Examiner Printing Co....San Francisco, Calif.	360
KUY	Coast Radio Co.....El Monte, Calif.	256
KWG	Portable Wireless Telephone Co., Stockton, Calif.	360
KWH	Los Angeles Examiner.....Los Angeles, Calif.	360
KYQ	The Electric Shop.....Honolulu, Hawaii	270
KYW	Westinghouse Electric & Mfg. Co., Chicago, Ill.	536
KZM	Preston D. Allen.....Oakland, Calif.	360
WAAB	Valdemar Jensen .....New Orleans, La.	268
WAAC	Tulane University .....New Orleans, La.	360
WAAD	Ohio Mechanics Institute.....Cincinnati, Ohio	360
WAAF	Chicago Daily Drovers Journal....Chicago, Ill.	286
WAAM	I. R. Nelson Co.....Newark, N. J.	263
WAAN	University of Missouri.....Columbia, Mo.	254
WAAW	Omaha Grain Exchange.....Omaha, Nebr.	286
WABB	Harrisburg Sporting Goods Co...Harrisburg, Pa.	286
WABD	Parker High School.....Dayton, Ohio	283
WABE	Y. M. C. A.....Washington, D. C.	283
WABG	Arnold Edwards Piano Co.....Jacksonville, Fla.	275
WABH	Lake Shore Tire Co.....Sandusky, Ohio	240
WABI	Bangor Railway & Electric Co....Bangor, Me.	240
WABL	Connecticut Agricultural College...Storrs, Conn.	283
WABM	F. A. Doherty Automotive & Radio Equipment Co., Saginaw, Mich.	254
WABO	Lake Avenue Baptist Church, Rochester, N. Y.	283
WABP	Robert F. Weinig.....Dover, Ohio	360
WABQ	Haverford College Radio Club...Haverford, Pa.	261
WABR	Scott High School.....Toledo, Ohio	270
WABU	Victor Talking Machine Co.....Camden, N. J.	226
WABV	John H. DeWitt.....Nashville, Tenn.	261
WABW	College of Wooster.....Wooster, Ohio	234
WABX	Henry B. Joy.....Mount Clemens, Mich.	270
WABY	John Magaldi, Jr.....Philadelphia, Pa.	242
WABZ	Coliseum Place Baptist Church..New Orleans, La.	263
WBAA	Purdue University .....West Lafayette, Ind.	360
WBAH	The Dayton Co.....Minneapolis, Minn.	417
WBAN	Wireless Phone Corporation.....Paterson, N. J.	244
WBAO	James Millikin University.....Decatur, Ill.	360
WBAP	Wortham-Carter Pub. Co. (Star Telegram), Fort Worth, Tex.	476
WBAV	Erner & Hopkins Co.....Columbus, Ohio	423
WBAX	John H. Stenger, Jr.....Wilkes-Barre, Pa.	360
WBAY	Western Electric Co.....New York, N. Y.	492
WBBA	Plymouth Congregational Church..Newark, Ohio	360
WBBD	Barbey Battery Service.....Reading, Pa.	234
WBBG	Irving Vermilya .....Mattapoisett, Mass.	248
WBBH	J. Irving Bell.....Port Huron, Mich.	246
WBBJ	Neel Electric Co.....West Palm Beach, Fla.	250
WBBL	Grace Covenant Church.....Richmond, Va.	263
WBBM	Frank Atlass Produce Co.....Lincoln, Ill.	226
WBBN	A. B. Blake.....Wilmington, N. C.	275
WBBP	Petoskey High Shool.....Petoskey, Mich.	246
WBBR	Peoples Pulpit Association.....Rossville, N. Y.	272
WBBT	Lloyd Bros. .....Philadelphia, Pa.	234
WBBU	Jenks Motor Sales Co.....Monmouth, Ill.	224
WBBV	Johnstown Radio Co.....Johnstown. Pa.	248
WBBW	Ruffner Junior High School.....Norfolk, Va.	222
WBBY	Washington Light Infantry....Charleston, S. C.	265
WBBZ	Noble S. Watson.....Indianapolis, Ind.	227
WBS	D. W. May (Inc.).....Newark, N. J.	360
WBT	Southern Radio Corporation....Charlotte, N. C.	360
WBZ	Westinghouse Elec. & Mfg. Co., Springfield, Mass.	337
WCAD	St. Lawrence University.....Canton, N. Y.	280
WCAE	Kaufmann & Bauer Co.....Pittsburgh, Pa.	462
WCAG	Clyde R. Randall.....New Orleans, La.	268
WCAH	Entrekin Electric Co.....Columbus, Ohio	286
WCAJ	Nebraska Wesleyan University, University Place, Nebr.	360
WCAK	Alfred P. Daniel.....Houston, Tex.	263
WCAL	St. Olaf College.....Northfield, Minn.	360
WCAO	Sanders & Stayman Co.....Baltimore, Md.	360
WCAP	Chesapeake & Potomac Tel. Co., Washington, D. C.	469
WCAR	Southern Radio Corp. of Texas, San Antonio, Tex.	360
WCAS	William Hood Dunwoody Industrial Institute, Minneapolis, Minn.	280
WCAT	South Dakota State School of Mines, Rapid City, S. Dak.	248
WCAU	Durham & Co.....Philadelphia, Pa.	286
WCAV	J. C. Dice Electric Co.....Little Rock, Ark.	360
WCAX	University of Vermont.....Burlington, Vt.	360
WCAZ	Carthage College .....Carthage, Ill.	246
WCBA	Charles W. Heimbach.....Allentown, Pa.	280
WCBC	University of Michigan.....Ann Arbor, Mich.	280
WCBD	Wilbur G. Voliva.....Zion, Ill.	345
WCBE	Uhalt Radio Co.....New Orleans, La.	263
WCBG	Howard S. Williams.....Pascagoula, Miss.	268
WCBH	University of Mississippi.....Oxford, Miss.	247
WCBM	Charles Schwarz .....Baltimore, Md.	360
WCBX	Radio Shop of Newark.....Newark, N. J.	233
WCBZ	Coppotelli Brothers' Music House, Chicago Heights, Ill.	
WCK	Stix-Baer & Fuller Dry Goods Co., St. Louis, Mo.	360
WCX	Detroit Free Press.....Detroit Mich.	517
WDAE	Tampa Daily Times.....Tampa Fla.	360
WDAF	Kansas City Star.....Kansas City, Mo.	411
WDAG	J. Laurance Martin.....Amarillo, Tex.	263
WDAH	Trinity Methodist Church (South), El Paso, Tex.	268
WDAK	The Courant .....Hartford, Conn.	281
WDAP	Drake Hotel .....Chicago, Ill.	360
WDAR	Lit Brothers .....Philadelphia, Pa.	395
WDAS	Samuel A. Waite.....Worcester, Mass.	360
WDAU	Slocum & Kilburn.....New Bedford, Mass.	360
WDAY	Radio Equipment Corporation....Fargo, N. Dak.	244
WDBC	Kirk, Johnson & Co.....Lancaster, Pa.	258

THE SUPER-UNIDYNE

The Super-Unidyne is a three tube Super-Heterodyne with two stages of Tuned Radio Amplification and any form of Audio which may be desired.



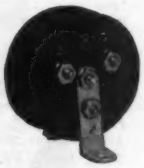
THE SUPER-UNIDYNE IS NOT NEW

Kit for building the Super-Unidyne Including all Special Coils, Set of Full Size Blue Prints, Instructions, etc. $16.00

Full size blue prints only, set of two 21" x 42" 1.50

No. 35 Tuned R. F. Transformer, for all circuits.

Price $2.50



Intermediate Transformer, made in 30-50-100 K. C., for all circuits.

Price $3.50

More than a hundred sets built by experimenters employing the Super-Unidyne Circuit have shown truly wonderful results. Amateurs without previous knowledge of the Super-Unidyne have expressed their admiration at the ease with which stations could be selected and interference eliminated. Discriminating users, after having tried practically every other modern circuit, especially appreciate the superior qualities of the Super-Unidyne.

The Super-Unidyne, although designed for antenna and ground, is unique in the ease of its selectivity. From three to five 360 meter stations may be heard in one evening, while still others are broadcasting on the same frequency. In our locality Los Angeles, California and Philadelphia—both on the same wavelength—have been tuned in the same evening without interference, while powerful stations 6 miles away were operating! WOAW on 526 meters and WOO on 509 meters have been easily tuned in, completely eliminating a 517 meter station three miles away. If more convenient ground only may be used as antenna with higher efficiency than a loop set.

Four dials are required for tuning, which tune together and log perfectly providing the convenience of enabling stations to be readily tuned in without interference when desired. No hunting for concerts if you have a log book. Tuned Radio Frequency Amplification plus oscillator action give all signals additional strength, regardless of distance. One stage Intermediate Amplification assures full volume and a clear, pure tone without distortion.

Uniradio small diameter air core transformers and tuned R. F. Transformers have made the Super-Unidyne possible. Kits, priced at $16.00, designed exclusively for the experimenter, together with blue print, make it possible for everyone to build their own set. Blue print only, showing wiring diagram and details of construction—$1.50.

Uniradio Transformers and Parts mean a decided improvement in Super-Heterodyne sets. Complete kits for any type super may be purchased at prices ranging from $7.50 to $20.00.

If you contemplate building a new set, or adding the latest improvements to your old one, it will pay you to insist on genuine Uniradio parts. We will gladly send descriptive matter and catalog gratis for the asking.

If your Dealer does not carry UNIRADIO Parts we will supply you direct. Jobbers and Distributors will want our line. Write or wire for proposition.

UNIRADIO MANUFACTURING COMPANY

Makers of

High Grade Radio Apparatus

Sale Dept., Jos. Mack Bldg.

Detroit, Michigan

WDBL	Immanuel Lutheran Church of Valparaiso,	Valparaiso, Ind.	273
WDBP	Superior State Normal School	Superior, Wis.	261
WDM	Church of the Covenant	Washington, D. C.	234
WDZ	James L. Bush	Tuscola, Ill.	278
WEAA	Frank D. Fallain	Flint, Mich.	250
WEAF	American Tel. & Tel. Co.	New York, N. Y.	492
WEAH	Wichita Board of Trade	Wichita, Kans.	280
WEAI	Cornell University	Ithaca, N. Y.	296
WEAJ	University of South Dakota	Vermillion, S. Dak.	283
WEAM	Borough of North Plainfield,	North Plainfield, N. J.	286
WEAN	Shepard Co.	Providence, R. I.	273
WEAO	Ohio State University	Columbus, Ohio	360
WEAP	Mobile Radio Co.	Mobile, Ala.	360
WEAR	Evening News Publishing Co.	Baltimore, Md.	261
WEAU	Davidson Bros. Co.	Sioux City, Iowa	360
WEAY	Iris Theater	Houston, Tex.	360
WEB	Benwood Co.	St. Louis, Mo.	273
WEBE	Roy W. Waller	Cambridge, Ohio	360
WEBH	Edgewater Beach Hotel Co.	Chicago, Ill.	370
WEBK	Grand Rapids Radio Co.	Grand Rapids, Mich.	360
WEV	Hurlburt-Still Electrical Co.	Houston, Texas	263
WEW	St. Louis University	St. Louis, Mo.	280
WFAA	Dallas News and Dallas Journal	Dallas, Tex.	476
WFAB	Carl F. Woose	Syracuse, N. Y.	234
WFAM	Times Publishing Co.	St. Cloud, Minn.	273
WFAH	Electric Supply Co.	Port Arthur, Tex.	238
WFAN	Hutchinson Elec. Service Co.,	Hutchinson, Minn.	360
WFAV	University of Nebraska	Lincoln, Nebr.	275
WFBG	Robert B. Gable	Altoona, Pa.	360
WFBH	Hotel Majestic	New York City	273
WFI	Strawbridge & Clothier	Philadelphia, Pa.	395
WGAL	Lancaster Elec. Sup. & Const. Co.,	Lancaster, Pa.	248
WGAN	Cecil E. Lloyd	Pensacola, Fla.	360
WGAQ	W. G. Patterson	Shreveport, La.	252
WGAZ	South Bend Tribune	South Bend, Ind.	360
WGI	American Radio and Research Corporation,	Medford Hillside, Mass.	360
WGL	Thomas F. J. Hewlett	Philadelphia, Pa.	360
WGR	Federal Tel. & Tel. Co.	Buffalo, N. Y.	319
WGY	General Electric Co.	Schenectady, N. Y.	380
WHA	University of Wisconsin	Madison, Wis.	360
WHAA	State University of Iowa	Iowa City, Iowa	484
WHAD	Marquette University	Milwaukee, Wis.	280
WHAG	University of Cincinnati	Cincinnati, Ohio	222
WHAH	Hafer Supply Co.	Joplin, Mo.	283
WHAK	Roberts Hardware Co.	Clarksburg, W. Va.	258
WHAM	University of Rochester (Eastman School of	Music), Rochester, N. Y.	283
WHAR	Seaside House	Atlantic City, N. J.	275
WHAS	Courier-Journal and Louisville Times,	Louisville, Ky.	400
WHAV	Wilmington Elec. Spea. Co.	Wilmington, Del.	360
WHAZ	Rensselaer Polytechnic Institute	Troy, N. Y.	380
WHB	Sweeney School Co.	Kansas City, Mo.	411
WHK	Radiovox Co.	Cleveland, Ohio	283
WHN	George Schubel	New York, N. Y.	360
WIAB	Art A. Johnson's Garage	Rockford, Ill.	252
WIAC	Galveston Tribune	Galveston, Tex.	360
WIAD	Howard R. Miller	Philadelphia, Pa.	254
WIAK	Journal-Stockman Co.	Omaha, Nebr.	278
WIAQ	Chronicle Publishing Co.	Marion, Ind.	226
WIAS	Home Electric Co.	Burlington, Iowa	283
WIK	K. & L. Electric Co.	McKeesport, Pa.	234
WIL	Continental Elec'l Supply Co.,	Washington, D. C.	360
WIP	Gimbel Bros.	Philadelphia, Pa.	509
WJAD	Jackson's Radio Eng'g Laboratories,	Waco, Tex.	360
WJAG	Norfolk Daily News	Norfolk, Nebr.	283
WJAK	Clifford L. White	Greentown, Ind.	254
WJAM	D. M. Perham	Cedar Rapids, Iowa	268
WJAN	Peoria Star	Peoria, Ill.	280
WJAQ	Capper Publications	Topeka, Kans.	360
WJAR	The Outlet Co.	Providence, R. I.	360
WJAS	Pittsburgh Radio Supply House	Pittsburgh, Pa.	286
WJAX	Union Trust Co.	Cleveland, Ohio	390
WJD	Denison University	Granville, Ohio	229
WJY	Radio Corporation of America,	New York, N. Y.	405
WJZ	Radio Corporation of America,	New York, N. Y.	455
WKAA	H. F. Paar	Cedar Rapids, Iowa	278
WKAD	Charles Looff (Crescent Park),	E. Providence R. I.	240
WKAF	W. S. Radio Supply Co.	Wichita Falls, Tex.	360
WKAN	United Battery Service Co.	Montgomery, Ala.	226
WKAQ	Radio Corporation of Porto Rico,	San Juan, P. R.	360
WKAR	Michigan Agri. College,	East Lansing, Mich.	280
WKAV	Laconia Radio Club	Laconia, N. H.	254
WKY	WKY Radio Shop	Oklahoma, Okla.	360
WLAG	Cutting & Washington Radio Corporation,	Minneapolis, Minn.	417
WLAH	Samuel Woodworth	Syracuse, N. Y.	234
WLAL	Naylor Electrical Co.	Tulsa, Okla.	360
WLAP	W. V. Jordan	Louisville, Ky.	360
WLAQ	Arthur E. Schilling	Kalamazoo Mich.	283
WLAV	Electric Shop	Pensacola, Fla.	254
WLAW	Police Dept., City of N. Y.	New York, N. Y.	360
WLAX	Putnam Electric Co.	Greencastle, Ind.	231
WLB	University of Minnesota	Minneapolis, Minn.	360
WLBL	Wisconsin Dept. of Markets	Stevens Point, Wis.	278
WLW	Crosley Manufacturing Co.	Cincinnati, Ohio	423
WMAC	Clive B. Meredith	Cazenovia, N. Y.	261
WMAF	Round Hills Radio Corp.	Dartmouth, Mass.	360
WMAH	General Supply Co.	Lincoln, Nebr.	254
WMAK	Lockport Board of Commerce	Lockport, N. Y.	273
WMAL	Trenton Hardware Co.	Trenton, N. J.	256
WMAQ	Chicago Daily News	Chicago, Ill.	448
WMAV	Alabama Polytechnic Institute	Auburn, Ala.	250
WMAY	Kingshighway Presby. Church,	St. Louis, Mo.	280
WMC	Commercial Appeal	Memphis, Tenn.	500
WMU	Doubleday-Hill Electric Co.,	Washington, D. C.	261
WNAC	Shepard Stores	Boston, Mass.	278
WNAD	University of Oklahoma	Norman, Okla.	360
WNAL	R. J. Rockwell	Omaha, Nebr.	286
WNAP	Wittenberg College	Springfield, Ohio	278
WNAR	C. C. Rhodes	Butler, Mo.	231
WNAT	Lenning Brothers Co.	Philadelphia, Pa.	360
WNAW	Henry Kunzman	Box 167, Fort Monroe, Va.	360
WNAX	Dakota Radio Apparatus Co.,	Yankton, S. Dak.	244
WNYC	Municipality of New York	New York City	526
WOAC	Page Organ Co. (H. P. Maas)	Lima, Ohio	268
WOAE	Midland College	Fremont, Nebr.	280
WOAF	Tyler Commercial College	Tyler, Tex.	360
WOAG	Apollo Theater	Belvidere, Ill.	273
WOAH	Palmetto Radio Corporation	Charleston, S. C.	360
WOAI	Southern Equipment Co.	San Antonio, Tex.	395
WOAN	James D. Vaughn	Lawrenceburg, Tenn.	360
WOAO	Lyradion Mfg. Co.	Mishawaka, Ind.	360
WOAT	Boyd M. Hamp	Wilmington, Del.	360
WOAV	Pennsylvania Nat. Guard, 112th Inf.	Erie, Pa.	242
WOAW	Woodmen of the World	Omaha, Nebr.	526
WOAX	Franklyn J. Wolff	Trenton, N. J.	240
WOC	Palmer School of Chiropractic	Davenport, Iowa	484
WOI	Iowa State College	Ames, Iowa	360
WOO	John Wanamaker	Philadelphia, Pa.	509
WOQ	Western Radio Co.	Kansas City, Mo.	360
WOR	L. Bamberger & Co.	Newark, N. J.	405
WOS	Missouri State Market'g Bu.,	Jefferson City, Mo.	441
WPAB	Pennsylvania State College	State College, Pa.	393
WPAC	Donaldson Co.	Okmulgee, Okla.	336
WPAJ	Doolittle Radio Corp.	New Haven, Conn.	268
WPAK	North Dakota Agricultural College,	Agricultural College, N. D.	283
WPAL	Avery & Loeb Electric Co.	Columbus, Ohio	286
WPAM	Auerbach & Guettel	Topeka, Kans.	360
WPAU	Concordia College	Moorehead, Minn.	395
WPAZ	John R. Koch	Charleston, W. Va.	273
WQAA	Horace A. Beale, Jr.	Parkersburg, Pa.	360
WQAC	E. B. Gish	Amarillo, Texas	234
WQAE	Moore Radio News Station	Springfield, Vt.	275
WQAF	Sandusky Register	Sandusky, Ohio	246
WQAL	Coles County Tele. & Teleg. Co.,	Matteon, Ill.	238
WQAM	Electric Equipment Co.	Miami, Fla.	283
WQAN	Scranton Times	Scranton, Pa.	280
WQAO	Calvary Baptist Church	New York, N. Y.	360
WQAQ	W. Texas Radio Co. (Abilene Daily Reporter),	Abilene, Texas	360
WQAS	Prince-Walter Co.	Lowell, Mass.	268
WQAX	Radio Equipment Co.	Peoria, Ill.	248
WQJ	Calumet Rainbow Broadcasting Co.,	Chicago, Ill.	448
WRAF	The Radio Club	Laporte, Ind.	224
WRAL	Northern States Power Co.,	St. Croix Falls, Wis.	248
WRAM	Lombard College	Galesburg, Ill.	244
WRAN	Black Hawk Electrical Co.	Waterloo, Iowa	236
WRAO	St. Louis Radio Service Co.	St. Louis, Mo.	360
WRAV	Antioch College	Yellow Springs, Ohio	242
WRAW	Avenue Radio Shop	Reading, Pa.	238
WRAX	Flexon's Garage	Gloucester City, N. J.	268
WRC	Radio Corporation of America,	Washington, D. C.	469
WRK	Doron Bros. Electrical Co.	Hamilton, Ohio	360
WRL	Union College	Schenectady, N. Y.	360
WRM	University of Illinois	Urbana, Ill.	360
WRR	City of Dallas, Police and Fire Signal Dept.,	Dallas, Texas	360
WRW	Tarrytown Radio Res'ch Lab.,	Tarrytown, N. Y.	273
WSAB	Southeast Missouri State Teachers College,	Cape Girardeau, Mo.	360
WSAC	Clemson Agricultural Col.,	Clemson College, S. C.	360
WSAD	J. A. Foster Co.	Providence, R. I.	261
WSAI	United States Playing Card Co.,	Cincinnati, O.	399
WSAJ	Grove City College	Grove City, Pa.	360
WSAN	Allentown Radio Club	Allentown, Pa.	229
WSAP	Seventh Day Adventist Temple	N. Y. City	263
WSAR	Doughty & Welch Elec. Co.,	Fall River, Mass.	254
WSAY	Port Chester Chamber of Commerce,	Port Chester, N. Y.	233
WSAZ	Chase Electric Shop	Pomeroy, Ohio	258
WSOE	School of Engineering	Milwaukee, Wisc.	246
WSB	Atlanta Journal	Atlanta, Ga.	429
WSL	J. & M. Electrical Co.	Utica, N. Y.	273
WSY	Alabama Power Co.	Birmingham, Ala.	360
WTAB	(No name)	Fall River, Mass.	360
WTAC	Penn Traffic Co.	Johnstown, Pa.	275
WTAF	Louis J. Gallo	New Orleans, La.	263
WTAG	Kern Music Co.	Providence, R. I.	258
WTAJ	The Radio Shop	Portland, Me.	236
WTAL	Toledo Radio & Electric Co.	Toledo, Ohio	252
WTAM	Willard Storage Battery Co.	Cleveland, Ohio	390
WTAP	Cambridge Radio & Electric Co.	Cambridge, Ill.	242
WTAQ	S. H. Van Gordon & Son	Osseo, Wis.	254
WTAR	Reliance Electric Co.	Norfolk, Va.	280
WTAS	Charles E. Erbstein	Elgin, Ill.	286
WTAT	Edison Electric Illuminating Co.,	Boston, Mass.	244
WTAU	Ruegg Battery & Electric Co.	Tecumseh, Nebr.	242
WTAW	Agricultural and Mechanical College of Texas,	College Station, Tex.	280
WTAX	Williams Hardware Co.	Streator, Ill.	231
WTAY	Oak Leaves Broadcasting Station,	Oak Park, Ill.	263
WTAZ	Thomas J. McGuire	Lambertville, N. J.	263
WTG	Kansas State Agricultural College,	Manhatan, Kans.	371
WTL	H. G. Saal Co.	Chicago, Ill.	360
WWAB	Hoenig, Swern & Co.	Trenton, N. J.	220
WWAD	Wright & Wright (Inc.)	Philadelphia, Pa.	360
WWAE	Lawrence J. Crosley	Joliet, Ill.	227
WWI	Ford Motor Co.	Dearborn, Mich.	375
WWJ	Detroit News	Detroit, Mich.	517
WWL	Loyola University	New Orleans, La.	394

Canadian Stations

CKLC	Wilkinson Electric Co., Ltd.	Calgary, Alta.
CJCD	T. Eaton Co., Ltd.	Toronto, Ont.
CFCU	Jack V. Elliot, Ltd.	Hamilton, Ont.
CFLC	Chas. Guy Hunter	London, Ont.
CHCS	The Hamilton Spectator	Hamilton Ont.
CHYC	Northern Electric Co., Ltd.	Montreal P. Q.
CFCF	Marconi W. T. Co. of Can., Ltd.,	Montreal, P. Q.
CKCO	Dr. G. M. Geldert	Ottawa, Ont.
CHNC	Toronto Radio Research Society,	Toronto, Ont.
CKCH	Canadian National Railways	Ottawa, Ont.
CJCM	J. L. Philippe Landry	Mont Joli, P. Q.
CHXC	J. R. Booth, Jr.	Ottawa, Ont.
CHCE	Western Canada Radio Supply,	Victoria, B. C.
CKY	Manitoba Telephone System	Winnipeg, Man.
CKCD	Vancouver Daily Province	Vancouver, B. C.
CFCA	Star Publishing & Printing Co.,	Toronto, Ont.
CFAC	The Calgary Herald	Calgary, Alta.
CKAC	La Presse Publishing Co., Ltd.,	Montreal, P. Q.
CFCH	Abitibi Power & Paper Co., Ltd.,	Iroquois Falls, Ont.
CJCF	The News Record	Kitchener, Ont.
CJGC	London Free Press Printing Co., Ltd.	London, Ont.
CFRC	Queen's University	Kingston, Ont.
CFCQ	Radio Specialties, Ltd.	Vancouver, B. C.
CFDC	Sparks Company	Nanaimo, B. C.
CJCA	The Edmonton Journal, Ltd.	Edmonton, Alta.
CFCK	Radio Supply Co., Ltd.	Edmonton, Alta.
CJCE	Sprott Shaw Radio Co.	Vancouver, B. C.
CFCL	Centennial Methodist Church	Victoria, B. C.
CJSC	The Evening Telegram	Toronto, Ont.
CFYC	Victor Wentworth Odium	Vancouver, B. C.
CFXC	Westminster Trust Co.	New Westminster, B. C.
CKCI	Le "Soliel" Limitee	Quebec, P. Q.
CFQC	The Electric Shop, Ltd.	Saskatoon, Sask.
CHBC	The Albertan Publishing Co.	Calgary, Alta.

British Stations

2LO	London	
5IT	Birmingham	
5WA	Cardiff	
6BM	Bournemouth	
2ZY	Manchester	
5NO	Newcastle	
5SC	Glasgow	
2BD	Aberdeen	
6SL	Sheffield (relay station)	

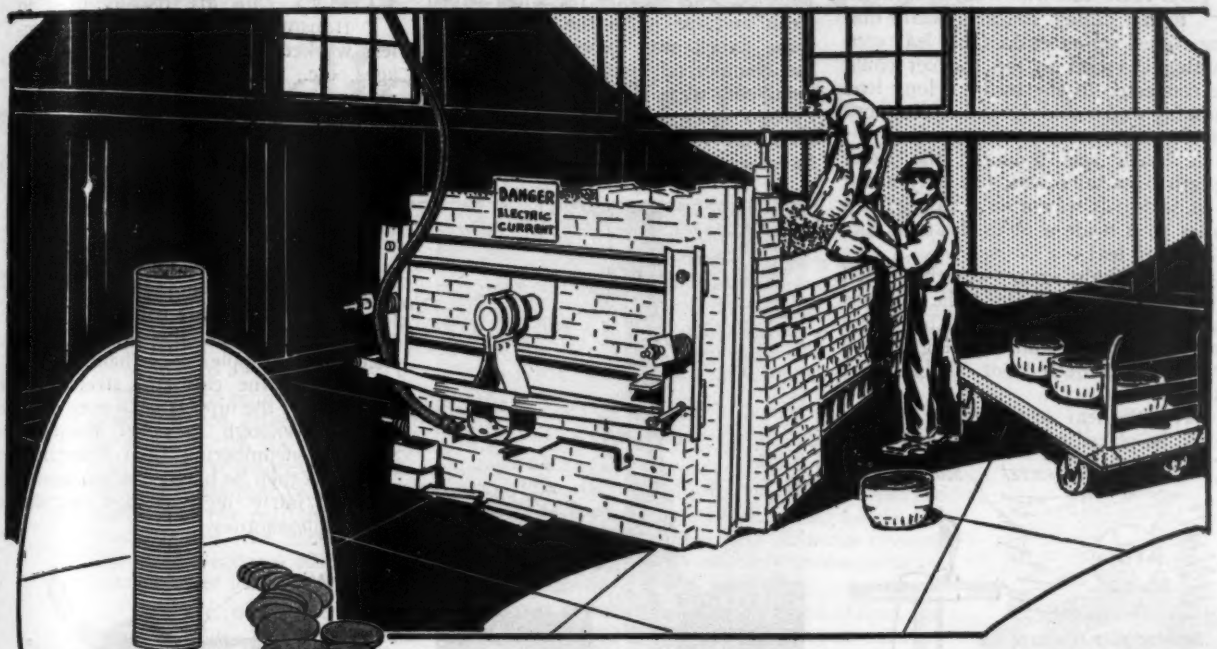
French Stations

YN	Lyon	
FL	Paris (Eiffel Tower)	
ESP	Paris	
8AJ	Paris	

Cuban Stations

PWX	Cuban Telephone Co.	Habana
2DW	Pedro Zazas	Habana
2AB	Alberto S. de Bustamante	Habana
2OK	Marie Garcia Vélez	Habana
2BY	Frederick W. Borton	Habana
2CX	Frederick W. Borton	Habana
2EV	Westinghouse Elec. Co.	Habana
2TW	Roberto E. Ramires	Habana
2HC	Heraldo de Cuba	Habana
2LC	Luis Casas	Habana
2KD	E. Sanchez de Fuentes	Habana
2MN	Fausto Simon	Habana
2MG	Manuel G. Salas	Habana
2JQ	Raul Pérez Falcon	Habana
2KP	Alvaro Dasa	Habana
2HS	Julio Power	Habana
2OL	Oscar Collado	Habana
2WW	Amadeo Saenz	Habana
5EV	Leopold V. Figueroa	Colon
6KW	Frank H. Jones	Tuinucu
6KJ	Krank H. Jones	Tuinucu
5EV	Leopoldo V. Figueroa	Colon
6DW	Eduardo Terry	Cienfuegos
6BY	José Ganduxe	Cienfuegos
6AZ	Valentin Ulivarri	Cienfuegos
6EV	Josefa Alvares	Caibarién
7AZ	Pedro Nogueras	Camaguey
7BY	Salvador Dimula	Camaguey
8AZ	Alfredo Broocks	Santiago de Cuba
8BY	Alberto Ravelo	Santiago de Cuba
8FU	Andrés Vinnet	Santiago de Cuba
8DW	Pedro C. Andus	Santiago de Cuba
8EV	Eduardo Mateos	Santiago de Cuba
8GT	Juan F. Chibas	Santiago de Cuba

Producing Graphite Discs in Allen-Bradley Electric Furnaces



Graphite Discs from the Electric Furnace

Allen-Bradley Radio Products are the best insurance against trouble

FINE, stepless control is not the only distinctive feature of Allen-Bradley graphite disc radio devices. It is true that with no other type of rheostat can you enjoy the noiseless, stepless, selective control of the Bradleystat. No adjustable grid leak can equal the Bradleyleak.

But there also is the inherent reliability of the graphite discs, produced in the terrific heat of the electric furnace, and encased in porcelain containers that cannot warp. Atmospheric changes mean nothing to graphite discs. Corrosion cannot destroy them. Continuous use cannot impair their perfect operation.

The slight extra cost of Allen-Bradley radio products is an insignificant premium on insurance against interrupted radio reception. Think this over! The quality endures after the price is forgotten.

Allen-Bradley Co.
Electric Controlling Apparatus
283 Greenfield Ave. A-B Milwaukee, Wis.
Manufacturers of Graphite Disc Rheostats for more than 20 years

ALLEN BRADLEY CO.
283 Greenfield Av.
Milwaukee, Wis.
Please send me descriptive leaflets on Allen-Bradley radio products.

Name.....

Address.....

"Quality Goods for Quality Readers"

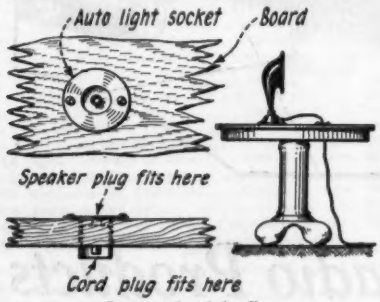
Radio Leaf for the Dining Room Table

ONE radio fan who wanted to listen to the dinner concerts while dining rigged up an extra table leaf containing a socket so the speaker could be connected to the set by a long lead running under the rug and entirely out of the way.

A board was procured the exact length of a table leaf, but only about 3 in. wide. It was fitted with pegs and holes so it made a fit in the table like a regular leaf.

An auto light socket was then fitted in this leaf about a third the distance from one end as shown. The flange was countersunk and the plug end of the socket projected out on the under side.

With the leaf in place, the speaker could be placed on the table and plugged in at this socket. Another plug was attached to the end of the lead wire and plugged in from under the table.



Constructional details

This arrangement allowed moving about the table and did away with all interfering wires. By staining the leaf to match the table it was unnoticed.

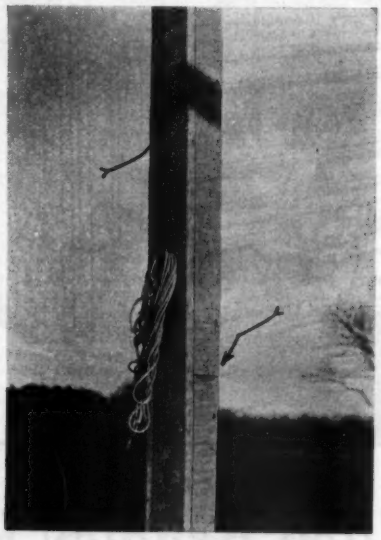
Small Panels Made From Storage Battery Cells

MANY radio enthusiasts deny themselves some of the necessary things in building small sets or units because of the expense connected. One of these essentials is a panel. Substitutes are used such as wood, cardboard, etc., when really hard rubber or composition should be used, both because they are good insulators and stiff enough to stand handling under all conditions. The writer recently made use of some old storage battery rubber cells for panel purposes.

An old storage battery was torn apart for the plates and the cells were set aside as useless. Suddenly it dawned upon the writer to use these cells for some panels for assembling some small units.

Consequently, with a hack-saw and sharp knife, the sides of the cells were cut out in rough shape and size, then the edges smoothed down with a coarse file until they were perfectly straight and squared with each other.

The surface was smoothed down with fine emery cloth and lastly polished with an oily rag, then wiped clean and dry. As the thickness of these panels was somewhat less than the commercial kind many of the instruments were shimmed up with one or two washers more than usual, but all in all, these storage battery panels have served wonderfully well.


Radio mast—arrows show how joints are separated

Sensible Radio Mast Construction

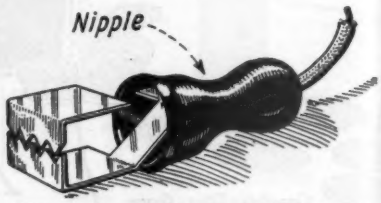
THE construction of metal pipe masts for radio receiving sets is not always possible—either for lack of funds or lack of available material. Wooden masts constructed of seasoned lumber are unsatisfactory because of the cumbersome weight and brittleness of such wood in high winds. The photograph shows a *good* way to build a wooden mast—that is cheap, flexible and extremely light. This mast has been up a year. It is forty feet high and five inches thick, constructed as a hollow square. The secret of its strength lies in its construction.

The mast is made of nothing but common spruce "furring" 3 in. wide and ¾ thick. The pieces are boxed in the form of a square *but* the joints are every one lapped a couple of feet beyond any other joint so that no two joints on any side come opposite each other. That is the whole secret. This mast, before it was raised, could be lifted by one man from the middle and, while it bent considerable, never issued a creak or a groan. It has withstood seven severe Atlantic Coast gales (being 2 miles from the coast) without a tremor. In two gales the wind blew over seventy miles an hour. It is braced by three wires from the middle and three from the top.

Rubber Nipple for Insulating Terminal Clips

HEAVY clips are usually used in transmitting sets by the wireless worker for changing battery voltages, etc., and sometimes he receives an unpleasant shock in his experiments. Temporary insulation is often made by winding electric tape, etc., about the clip, but is not always successful. Better insulators can be made as shown.

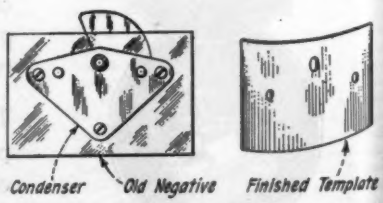
Get a few rubber nipples at the drug store and cut a hole in the ends slightly smaller than the diameter of the lead wires you are using. Remove the wires from the clips and push the holes in the nipples over them. Then resolder to the clip and stretch the open end of the nipples back over them just far enough to cover them up without encumbering their operation. They can then be handled when loaded with a fairly high voltage without any unpleasantness.



Use of rubber nipple to insulate battery clips

Old Films Used as Radio Templates

WHEN variable condensers or similar radio parts are fitted to a new panel one is often apt to drill the bolt holes a trifle out unless a template is used. To obviate this a template can be made from an old, clear negative as shown. A negative that is underexposed or has not been exposed at all will be sufficiently transparent.



Old film negatives used as radio templates

Place it over the portion of the apparatus desired and mark out the bolt holes in pencil. Then lay the film down on a board and cut out the marks with a sharp, pointed knife blade. The finished template is then placed on the panel and the proper position of the holes located by marking with pencil around the inside of the holes in the template and on the panel.

New complete line of radio batteries

AN even better battery and at a much lower cost! That is what you will say when you examine the new Exide "A" Battery.

The composition case including handles is moulded in one piece, beautifully stippled and finished in glossy black—an ornament to any room.

Notice the refinements that have been made—broad inter-cell connectors that fit close to the top of the battery and add to its sturdiness. Off-set terminal binding posts that facilitate hooking the battery to the set; the same wonderful Exide plates, the same separators and the same electrical efficiency as the old battery—yet lower in cost!

There are, of course, the Exide two-volt and four-volt "A" batteries for low voltage tubes. These are midgets in size but giants in power.

New "B" Battery in glass jars

With the increase in popularity of the many-tube sets has come the need for a "B" battery of greater capacity than the twenty-four volt, 4000 milliampere hour, rubber cell Exide used with smaller sets.

To meet this need the new Exide "B" batteries in glass jars were designed. They are made in two sizes—twenty-four and forty-eight volts but with larger plates and greater space for electrolyte, they have a capacity of 6000 milliampere hours.

The new Exide rectifier

With this attractive and compact rectifier, your "B" battery can be recharged from your regular alternating house current, at a cost that is insignificant because of its unusually efficient characteristics.

Whatever the size of your set, all of your battery needs can be filled from the complete Exide line. These batteries accepted everywhere as the standard of quality, are made by the world's largest manufacturer of storage batteries for every purpose.

Exide Radio Batteries are sold by Exide Service Stations and Radio Dealers. Ask to see them.

THE ELECTRIC STORAGE BATTERY COMPANY, PHILADELPHIA
In Canada, Exide Batteries of Canada, Limited, 133-157 Dufferin Street, Toronto

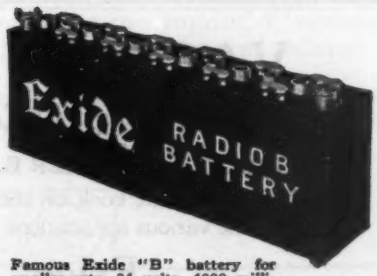
The beautiful new Exide 6-volt "A" battery in one-piece case. Many new refinements but the same old rugged power. $14.60 up f.o.b. Philadelphia.

Exide
RADIO BATTERIES

2-volt "A" battery for low-voltage tubes. Also made in 4-volt size. Prices $5.40 and $7.30 respectively f.o.b. Philadelphia.

New 24-volt Exide "B" battery in glass jars, 6000 milliampere hours capacity. Also made in 48-volt size. Prices $12.00 and $23.30 respectively f. o. b. Philadelphia.

New Exide Rectifier. The economical device for recharging your "B" battery from your house current. $2.00 f. o. b. Philadelphia.



Famous Exide "B" battery for smaller sets. 24 volts, 4000 milliampere hours capacity. $10.00 f.o.b. Philadelphia.

For better radio reception use storage batteries

"Quality Goods for Quality Readers"

An Innovation in Tuners

For Broadcast or Short Wave

No Wonder

The B-T Low Loss Tuner scored an instant success. It had the merit, otherwise it would never have appeared.

Consider. 1st. A development in coil winding and arrangement so effective that the full broadcast range is covered with an 11-plate B-T Condenser. Results: Louder signals, more distant stations and greater selectivity.

2nd. An adjustable untuned primary, one of those things so simple no one thought of it—but it solves the problem of varying local conditions.

3rd. An equally simple but efficient lossproof frame.

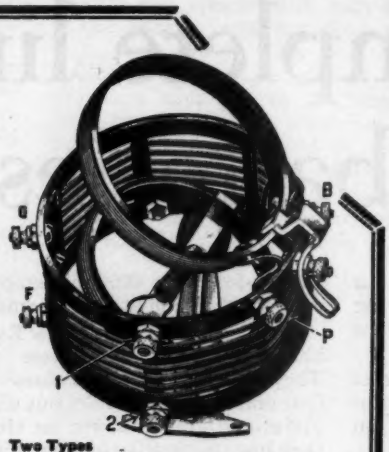
4th. A family history beginning with the first 3-circuit coupler and including nothing but original parts—all leaders.

5th. A record of its own of being the first LOW LOSS Broadcast or SHORT WAVE TUNER on the market.

You can't beat it—

For Broadcast 200-565 meters
For Short Wave 50-150 meters

P. S.—If it's a 5-Tube Set you want, read what George Colman, Kedvale Ave., Chicago, says: "Am getting wonderful results with the B-T "Nameless." With four Chicago stations and Elgin going full blast, I am pulling in such stations as Louisville, Philadelphia, Detroit, Cincinnati, Davenport, Pittsburg, Iowa City, etc. Have had as many as 14 outside stations in an evening, regardless of Chicago. The "Nameless" is all that's claimed for it." Write for descriptive folder.



Two Types

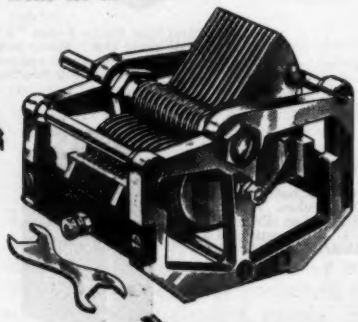
Broadcasting 200 to 565 meters. Short wave work 50 to 150 meters. (These ranges covered with B-T 11-plate "Lifetime" Laboratory Condenser.) $5.00

BREMER-TULLY "Lifetime" Condenser

Electrically Superior — Mechanically Beyond Comparison

150 m.m.f. 7 plates.....$4.25
250 m.m.f. 11 plates..... 4.50
520 m.m.f. 23 plates..... 5.00
800 m.m.f. 35 plates..... 6.50

"20 Point" Folder tells the details. Write for it.



If you don't find this condenser better—send it back.
The only Low Loss Straight line wave length condenser.
Grounded rotor and frame.
Light—compact.

A bearing that has no equal in radio. It can be adjusted without disturbing plate alignment or changing capacity. Exclusive B-T method of die casting insures perfect contacts and spacing to within 1/1000 of an inch.

"Better Tuning" (now in 6th edition) tells you why and shows you how. Complete instructions and diagrams for progressive construction from Crystal to Reflex and Radio Frequency circuits. Sent on receipt of 10c.

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532 S. Canal Street CHICAGO

VACUUM TUBES
In Wireless Communication

By ELMER E. BUCHER

The best text book on the market devoted solely to the various applications of the Oscillation Valve

Price, $1.75

THE WIRELESS PRESS, INC.
326 Broadway New York

Information Desk
Conducted by R. A. BRADLEY

Mr. A. P. Richmond, Gary, Indiana, asks: "What turn ratio will be necessary to put on the astatic transformers in the "D" coil receiver in order that I may use .00025 condensers to tune with?"

Using this form of capacity it is of course necessary to add more turns to the secondaries of the transformers. The .00025 variable condenser with a low minimum capacity around the order of a .000006 will tune from 200 to 570 meters when shunted across a D-coil secondary having 60 turns of No. 24 D. C. C. It will be better to increase the number of turns also in the primary to keep the ratio of one to five. In Mr. McIlvain's receiver he used the ratio of one to four, that is, ten turns in the primary and 40 turns in the secondary. But to tune this, he used a .001 condenser. With 12 turns in the primary and 60 turns in the secondary, the tuner will cover the same wavelength approximately and will be more efficient because the ratio of inductance to capacity is higher.

Mr. George E. Potter, of Washington, D. C., wishes advice concerning the use of a by-pass condenser across the primary of the first audio frequency transformer in the "D" coil receiver. In regenerative sets the use of your condenser across the transformer windings or across the B battery and transformer windings is of great assistance and in a general case where the set will not oscillate easily the addition of your condenser will generally correct the trouble. However, in a non-regenerative set such as the "D" coil a condenser across the primary of the first transformer has little effect and its presence is hardly noticed.

Mr. Allen F. Maybee, Goshen, N. Y., asks: "Is there any advantage in using a variable grid condenser or a variable grid leak or a variable condenser in the plate circuit across the phones and B battery?"

The advantages of a variable grid condenser are not particularly marked in any circuit. Most tubes operate satisfactorily with a grid condenser having a capacity of .00025 mfd. Some soft tubes such as the UV-200 and C-300 operate better with a .0005 mfd. condenser, but for general use the .00025 mfd. is correct. A variable grid leak is a different thing—a very important device. In a regenerative set of any type, it is to be recommended for smooth control of regeneration. In non-regenerative sets an approximate rating of 1½ or 2 megohms is generally all right for the storage battery tubes.

Several years ago one of the best regenerative receivers on the market at the time, included in its makeup a variable condenser across the phones, B-battery and A-battery in the plate circuit of the detector tube. This condenser was a distinct help in fine tuning, permitting the closest control of regeneration. Manufacturers of regenerative sets since then have substituted for it

a fixed condenser relying entirely upon the plate variometer or tickler coil for the control of feedback amplification. Personally, we are sorry to see it go, at it made regenerative set tuning a joy.

Mr. Geo. L. Crowder, of Pittsfield, Mass., asks: "What is meant by an aperiodic circuit?"

An aperiodic circuit is one without period or one which will not respond to any frequency. It is evident then that no circuit employing a coil and condenser can be aperiodic since this combination of inductance and capacity is an oscillating circuit and will respond to a definite frequency dependent upon the same inductance and capacity. In order to simplify tuning and minimize the number of controls on a receiver, it has been the practice, of late, to employ as a primary or antenna circuit a coil of about 10 turns inductivitely coupled to the secondary or grid tuning coil. This has erroneously been called an "aperiodic primary." It will be seen from the definition of an aperiodic that it cannot be such. It is in reality an "untuned primary" or rather one which the operator does not tune. Its coupling with secondary circuit, however, is so great that the tuning of the secondary circuit has the effect of tuning the primary. But it is not an "aperiodic" primary.

Mr. Frank Adams, of Northport, L. I., asks: "Can a lamp socket antenna be used with as good results as are obtained with a good outside antenna?"

Not as a general rule. The success of a lamp socket antenna seems to vary exceedingly with the locality in which it is used. In an apartment house where the lighting system is an independent power plant in the basement, it is often unsatisfactory. While a few blocks away in individual homes where the lighting system comes from the city power house it functions almost as well as an outside. It has been our personal experience to use a lamp socket antenna as a ground in connection with an outside antenna, with excellent results in overcoming a "dead" area.

Mr. Geo. E. Candler, Cincinnati, Ohio, asks: "What is meant by 100 ampere hour capacity with reference to a 6-volt Exide storage battery? Which is the positive terminal of a dry battery and how can it be determined? What is the voltage of one storage battery cell?"

The capacity of storage batteries is computed in ampere hours. A 6-volt 100 ampere hour battery is known as such because it will generally give 6 volts at one ampere drain for 100 hours. However, in actual practice before the hundred hours is completed the voltage falls to about 5.4. The voltage of a storage lead acid battery should be 6.6 volts when fully charged. This will drop to about 6.1 volts on a load of two or three tubes. When the voltage has dropped to 5.9 it is time to recharge it. The voltage of an individual storage cell runs from 1.8 when completely discharged to 2.2 when fully charged. The positive terminal of a dry cell is always the center post attached to the carbon rod running through the center of the cell. The outside zinc covering is always the negative terminal.

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The Measure *of* True Worth

SPECIFICATIONS

Circuit: Two stages of tuned radio frequency amplification, detector and two stages of audio frequency amplification. Non-oscillating.

Tubes: Five in all. Jacks provided for either five or four tube operation.

Batteries: Either storage or dry-cells.

Cables: Complete set supplied for "A" and "B" batteries.

Wave lengths: 200 to 600 meters, with uniform efficiency of reception.

Aerial: 75 to 125 feet, single wire.

Panel: Aluminum, with attractive crystal black finish. A perfect body capacity shield.

Dials: Sunken design. Shaped to fit the hand and permit a natural position in tuning.

Rheostats: Adequate resistance for all standard base commercial tubes.

Condensers: Single bearing, low leakage losses.

Sockets: Suspended on cushion springs which absorb vibrations.

Cabinet: Mahogany, with distinctive lines and high finish. Ample space provided for "B" batteries.

EFFICIENT performance, attractive appearance and moderate price are the three basic elements that comprise value in a receiving set, as in any other article. Trick names and catch phrases, used to designate circuits, mean little and often confuse the buyer.

All three essentials are combined in the Type 6-D Receiver.

Performance: Extraordinary selectivity widens the choice of programs. In close proximity to powerful stations, the sharpness of tuning is marked. Far distant points are received with unusual clarity and volume. Tuning is very simple. The three dials are closely matched at all wave lengths, and settings are easily memorized.

Appearance: The substantial mahogany cabinet, with distinctive lines and high finish, is a fitting addition to the living room or library. The symmetrical panel layout and interior construction bear the imprint of advanced thought and skilled workmanship.

Price: $125.00, without tubes and batteries, creates a new standard of value.

EISEMANN

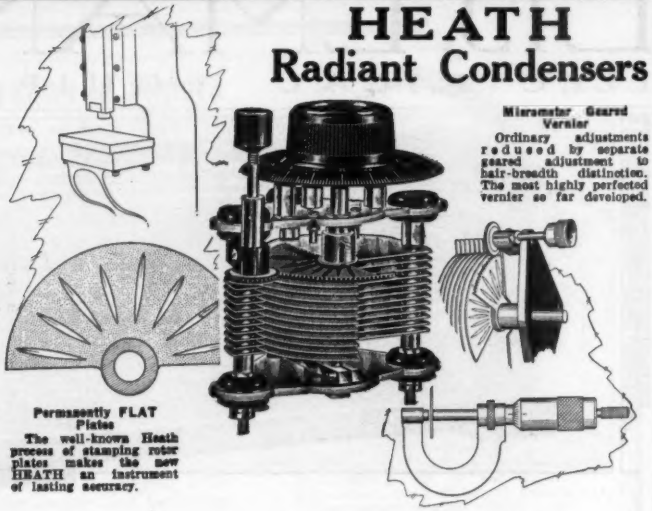
EISEMANN · MAGNETO · CORPORATION

General Offices: 165 Broadway, New York

DETROIT · SAN FRANCISCO · CHICAGO

"Quality Goods for Quality Readers"

HEATH
Radiant Condensers



Micrometer Geared Vernier
Ordinary adjustments reduced by separate geared adjustment to hair-breadth distinction. The most highly perfected vernier so far developed.

Permanently FLAT Plates
The well-known Heath process of stamping rotor plates makes the new HEATH an instrument of lasting accuracy.

Non-Dielectric Condensers

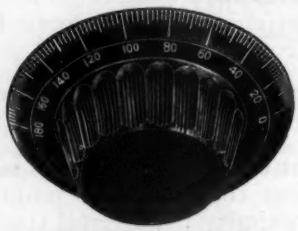
A NEW all-metal condenser. A new rigidity! A shaft perfectly centered in accurately machined bearings—true-running—for smoother operation. No contacts through bearings. Use Heath Condensers in your new set or hook-up.

Prices of Model "A" Vernier Type with Dial

No. 12 A. V.—12 plate.....$5.00
No. 24 A. V.—24 plate..... 5.50
No. 44 A. V.—44 plate..... 6.50

Plain Types in all sizes.

New HEATH Products



HEATH Bakelite Dials

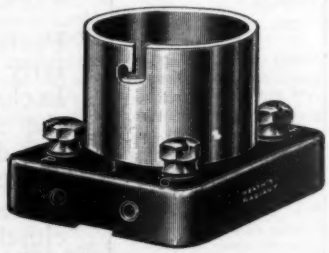
Specially designed easy grip-knob, beautifully proportioned, highly polished and clearly incised. Brass bushing centered by precision machinery to positive accuracy for perfect balance. Made in two (2) inch, three (3) inch and four (4) inch diameters. A typical HEATH product.

PRICES

No. 101—2 in. dial for ¼ in. shaft.....50 cts.
No. 102—3 " " " " " " .....65 cts.
No. 105—4 " " " " " " .....80 cts.

HEATH Sockets with the Exclusive Shock Absorber Feature

Bakelite base into which re-enforced phosphor bronze, self cleaning contacts are securely embedded. Binding posts are slotted hexagon nuts. HEATH Standards of material and workmanship. .....Price 75c



Write today for Literature

HEATH RADIO & ELECTRIC MFG. CO.
203 First Street, Newark, N. J.
Exclusive Canadian Distributor:
Marconi Wireless Telegraph Co., Ltd., Montreal, Canada

LEARN THE CODE

Get all the fun there is to be had from your wireless set. Learn to read the dots and dashes and double your pleasure.

The Marconi-Victor Records

Provide the ideal instruction

SIX DOUBLE FACED RECORDS—TWELVE LESSONS

From the alphabet to press and code work. Actual operating conditions reproduced. Satisfaction guaranteed.

Price: $5.00 per set

WIRELESS PRESS, Inc., 326 Broadway, New York

Broadcasting Outside the Studio

(*Continued from page* 51)

One of the very important considerations in the design of a line amplifier is the size and weight of the unit. As this outfit must be carried around from one place to another it should be comparatively light and convenient to handle. The standard line amplifier outfit is divided into two units: one unit containing the amplifier proper and the other containing the storage and plate batteries with a convenient plug and cord for connecting the two units very quickly.

LINES

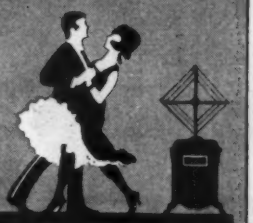
Although the lines, the connecting link between outside point and the transmitting station do not appear to be important, yet they are a vital factor toward good quality transmission. Just as the railroad tracks are the guides for the train, in the same manner do the lines guide the signal. If the tracks are in any way defective, no matter how efficient the locomotive may be, the train will be delayed on its journey; and if the lines are grounded or noisy or open, the signal will be "hashed up" and an otherwise good program spoiled, no matter how excellent the line amplifier equipment and transmitting apparatus may be.

Not only must the common faults as noise, grounds, and opens be corrected in a line used for broadcasting, but it is also necessary to compensate for the loss of the higher frequencies due to the capacity of the line. To prevent cross talk or induction it is telephone practice to use transposed lines instead of straight laid lines. But by using a transposed line—that is, twisted every 15 feet or so—the capacity of the line is increased to a greater extent. This capacity decreases or attenuates the higher frequencies and gives the line the characteristic as shown on page 50. For good quality it is desirable to transmit these higher frequencies. Therefore, this attenuation becomes serious in radio broadcasting. However, this effect is overcome by a method known as equalizing the line, by adding to it a unit which counteracts the attenuation and causes the sloping down characteristic of A in figure 4 to take the flat characteristic of B. Of course, it is necessary to design a separate equalizer for every length of line due to the difference of capacity values.

When a very long line is used then the attenuation becomes so pronounced that it is necessary to insert repeaters or amplifiers to bring the signal up to the proper value. Otherwise, the signal will either fall below the noise present in the line or become too weak to be picked up at the transmitting station. The number of repeaters used

HAROLD BOLSTER,
on behalf of the Principal Radio Manufacturers and Dealers of America
Presents—

THIRD ANNUAL



NATIONAL RADIO EXPOSITION
GRAND CENTRAL PALACE
NOV. 3rd. to 9th. 1924

This greatest radio show ever held will be *profit-sharing with exhibitors*

Special Election Week Program Features

Featuring, *in advance*, the most striking developments in the Radio art and the Radio industry for the coming year

—Receiving Set Models for 1925
—Phonograph Radio Combinations for 1925
—Improved Equipment for 1925

(Main and Mezzanine Floors)
NEW YORK CITY
"The World and his Girl will be there"

American Radio Exposition Co.
Director: HAROLD BOLSTER *General Manager:* J. C. JOHNSON
522 FIFTH AVENUE, Telephone: Vanderbilt 0068 NEW YORK

The Complete Efficient and Economical Aerial

ANTENELLA

No Aerial or Antenna Needed

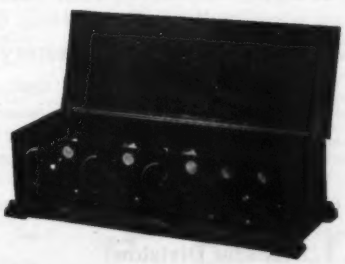
$1.25

Why pay $10.00 or more to have an aerial spoil the appearance of your home? Antenella eliminates all unsightly wiring, lightning arresters, etc., and precludes the possibility of dangerous grounding on a power line. It also stops "canary bird" re-radiation from nearby oscillating sets interfering.

ANTENELLA is not only a real distance getter, but also overcomes troublesome static.

At your Dealer, otherwise send purchase price and you will be supplied postpaid.

Chas. Freshman Co. Inc.
Radio Condenser Products
106 Seventh Ave. New York



THE NEW HOWARD 5-TUBE NEUTRODYNE

This remarkable Set has created a sensation. Beautiful black walnut cabinet—special Howard parts throughout and guaranteed to give excellent results.

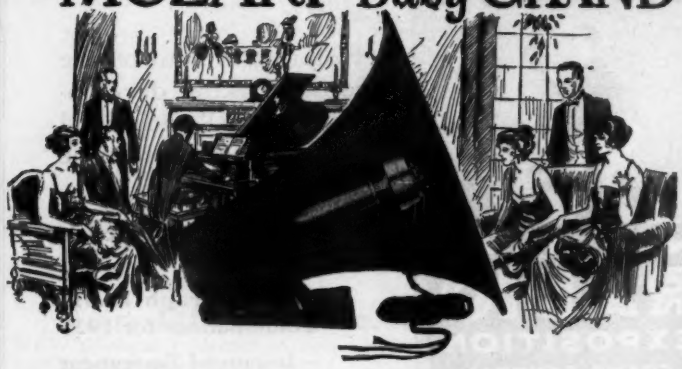
WRITE TODAY FOR FULL DESCRIPTION AND PRICES

HOWARD MANUFACTURING COMPANY
4248 Northwestern Avenue
Chicago, Ill.

Licensed by Independent Radio Manufacturers, Inc.
Reg. U.S. Pat. Off. NEUTRODYNE Reg. U.S. Pat. Off.
Pat. March 27, 1923 and April 1, 1924
Trademark Regs. Nos. 1,450,080 and 1,488,228
Other Patents Pending

"Quality Goods for Quality Readers"

Editorial Friends of
The MOZART Baby GRAND



THROUGH the radio business we have made a host of new friends in almost every part of the world and naturally none of these are more highly esteemed by us than those editorially associated with this country's newspapers and other publications. May we quote from another letter received just prior to going to press with this ad:

"The reproducer ordered from you arrived in good shape and I desire to express my surprise at the results. Have had little trouble getting stations in Chicago, New York, St. Louis, Cincinnati, Pittsburgh, Dallas, Miami, Tampa, Charlotte, Milwaukee, Jefferson City, Davenport, Atlanta, Havana, and others on the loud speaker, which reproduced the music and human voice almost perfectly."

(Signed) J. P. Leggett, In charge Sports & Radio Dept., The Macon News, Macon, Georgia.

PRICES . . . F. O. B. Factory.

Reproducer compelte in black and gold crocodile finish with (gold plated) unit and polarity-indicating cord	$12.00
New Model in black rubber finish with nickel plated unit as above	10.00
Unit only with polarity-indicating cord, gold plated	5.00
Unit only with polarity-indicating cord, nickel plated	4.00

Shipping weight of reproducer, 8 lbs. (approx.). Dimensions—Diameter of bell, 12". Length and height overall, 12½".

No extra Batteries required. Direct from the factory or through one of our authorized dealers.

(Radio Division)

THE MOZART GRANDÉ CO.

Manufacturers of Fine Instruments

NEWARK, N. J. U. S. A.

Practical Wireless Telegraphy

By Elmer E. Bucher

More than 90,000 copies of this book have been sold—your copy is ready to be shipped.

Price, $1.75

WIRELESS PRESS

326 BROADWAY NEW YORK

"Quality Goods for Quality Readers"

depends on the length and characteristics of the line.

Practically of the same importance as good equipment is the personal factor that is involved in outside broadcasting. The operator must be skilled in placing the microphone and manipulating the line amplifier. Especially is the placing of the microphones a highly specialized art. Taking the broadcasting of an orchestra, for example, it is necessary to reproduce an effect in the loud speaker at the home of the B. C. L. similar to that actually being played. If the microphones are not properly placed, certain instruments in the orchestra may predominate in intensity while others, such as the violins, may be lost entirely.

The World Flight

(*Continued from page* 35)

four. We also had an auxiliary transmitter consisting of a spark coil operated by dry cells.

The method of communication and the utmost importance of that communication to the World Flight can be very well estimated from these descriptions. The flight to Atka, and from there around to England, then via the North Atlantic to the United States is now a matter of common knowledge. News of the flight has been adequately handled by the newspapers. My purpose here is to impress those who are interested in the World Flight with the value of radio—not alone in the one trip around the world, but for the possible future establishment of a practical transportation system permanently girdling the earth.

Progress of U. S. World Flight

Santa Monica, left March 17
Sacramento, arrived March 17; left March 18 (370 mi.)
Eugene, arrived March 18; left March 19 (400 mi.)
Vancouver, arrived March 19; left March 20
Seattle, arrived March 20; left April 6 (195 mi.)
Pt. Rupert, arrived April 6; left April 10 (650 mi.)
Sitka, arrived April 10; left April 13 (380 mi.)
Seward, arrived April 13; left April 15 (550 mi.)
Chignik, arrived April 15; left April 19 (450 mi.)
Dutch Harbor, arrived April 19; left May 3 (400 mi.)
Atka Island, arrived May 3; left May 9 (350 mi.)
Attu Island, arrived May 9; left May 16 (530 (mi.)
Paramashiru, arrived May 17; left May 19 (878 mi.)
Yetorofu, arrived May 19; left May 22 (500 mi.)
Minato, arrived May 22; left May 22 (354 mi.)
Kasomigaura, arrived May 22; left June 2 720 mi.)
Kushimoto, arrived June 2; left June 3 (350 mi.)
Kagoshima, arrived June 3; left June 6 (425 mi.)
Shanghai, arrived June 6; left June 8 (500 mi.)
Amoy arrived June 8; left June 9 (500 mi.)
Hong Kong, arrived June 9; left June 10 (300 mi.)
Hai Phong, arrived June 10; left June 11 (300 mi.)
Tourane, arrived June 11; left June 17 (300 mi.)
Saigon, arrived June 17; left June 19 (300 mi.)
Bangkok, arrived June 20, left June 23 (675 mi.)
Rangoon, arrived June 23; left June 25 (450 mi.)
Akyab, arrived June 25; left June 26 (445 mi.)
Calcutta, arrived June 26; left July 1 (400 mi.)
Allahabad, arrived July 1; left July 2 (475 mi.)
Umballa, arrived July 3; left July 3 (500 mi.)
Multan, arrived July 3; left July 4 (450 mi.)
Karachi, arrived July 4; left July 7 (475 mi.)
Charbar, arrived July 7; left July 8 (330 mi.)

Now Take Transformers

Price $5.00

What difference does it make if you use any one of the many transformers on the market instead of a

PARAGON

Just this difference—

You need not worry about matched pairs or turn ratios or anything else.

When you buy

PARAGON

transformers you get the best that can be produced that are unsurpassed in performance and that are guaranteed to give greater volume and better quality than any transformer on the market today.

Buy them at your dealers

Paragon Catalog on request.

Send your dealer's name.

ADAMS-MORGAN CO., Inc.
8 Alvin Place
Upper Montclair, N. J.

Makers of

PARAGON
GUARANTEED RADIO PRODUCTS

Does Not Warp!

Resists the Most Rigid Tests

HEAT and weather changes, that play such havoc with rubber, are powerless to affect Spaulding Bakelite-Duresto panels which have never been known to warp, shrink nor split.

Highest in dielectric properties, and tensile strength, these panels saw, drill, engrave without chipping—retain indefinitely a beautiful mirror finish—all made possible by the special Spaulding process of fabrication.

Insist on Bakelite-Duresto, for the best that money can buy. Your dealer can furnish standard sizes from stock, special sizes to order. For a sign of quality apparatus, look for Spaulding Bakelite-Duresto panels in each set you buy.

Write nearest office for descriptive circular

SPAULDING FIBRE CO., INC., TONAWANDA, N. Y.

Manufacturers

who desire to build quality into their products and who insist on speed and economy in their plants should write to our nearest office for complete information on Spaulding Bakelite-Duresto.

Factory: Tonawanda, N.Y.
Sales Offices: Warehouses

484 Broome Street, New York City.
659 W. Lake St., Chicago.
310 E. Fourth Street, Los Angeles.
141 N. Fourth St., Phila.
15 Elkins St., Boston.
171 Second St., San Francisco.
509 First Nat'l Bank Bldg., Milwaukee.

Spaulding
BAKELITE-DURESTO
Panels - Sheets - Tubes - Rods

THE SOUTHWESTERN RADIO JOBBERS' ASSOCIATION

Announces its 1924 Southwestern Radio and Electrical Exposition in the Parkmoor Building, Dallas, Texas, October 14-19, inclusive.

Simultaneous with the Annual Texas State Fair when nearly ONE MILLION people will visit Dallas—especially eager to learn and buy. Will you get your share of this business?

WIRE OR WRITE

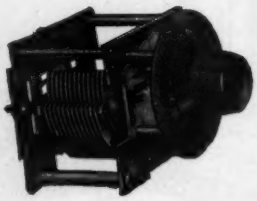
SOUTHWESTERN RADIO AND ELECTRICAL EXPOSITION

FOR YOUR SPACE RESERVATION

Exposition Office: Adolphus Hotel, Dallas, Texas GENERAL ADMISSION, 25c.

National VELVET VERNIER Condensers and Dials

TRADE MARK
REG. U.S. PAT. OFF.



PRICES of Condenser
(Including 3-inch Dial)

.001 $7.00
.0005 $6.00
.00035 $5.75
.00025 $5.50

DIAL Only

4-inch, $2.50 3-inch, $2.00

"Perfect Resonance Control"

That's the way a satisfied purchaser of a NATIONAL VELVET VERNIER DIAL and CONDENSER describes the liquid smoothness and flexibility of this perfect slow-motion dial and low-loss condenser.

Perfect because of perfection of design and skilled craftsmanship. No grating — no backlash — no loss. Every part in perfect accord.

Lustrous finish and graceful lines give a "million-dollar-look" to the home-built set.

NATIONAL COMPANY
CAMBRIDGE MASSACHUSETTS

PREMIER

Audio Frequency "HEGEHOG" Transformer
One-half actual size
$3.50

TRANSFORMER

A Leap Ahead of the Field

About the size of an English Walnut. Saves space; light weight; mounts anywhere; unsurpassed in performance. Ratios 1 to 2, 1 to 3, 1 to 5, $3.50. 1 to 10, $4.50. Ask your dealer to show you the Premier line of quality radio parts. Send for Free Bulletin No. 84 today!

Premier Electric Company
3000 Ravenswood Avenue Chicago

EBY +

There is only one GENUINE

EBY Binding Post

"With Tops Which Don't Come Off"

Eby Posts are scientifically designed, beautifully finished and their price is right.

EBYS are Binding Posts PLUS

H. H. EBY MFG. CO. Philadelphia

"Quality Goods for Quality Readers"

Bagdad (3 stops), arrived July 8; left July 9 (1,200 mi.)
Aleppo, arrived July 9; left July 10 (480 mi.)
Constantinople, arrived July 10; left July 12 (600 mi.)
Bucharest, arrived July 12; left July 13 (290 mi.)
Vienna, arrived July 13; left July 14 (800 mi.)
Paris, arrived July 14; left July 16 (540 mi.)
London, arrived July 16; left July 17 (225 mi.)
Brough (Hull), arrived July 17; left July 30 (155 mi.)
Kirkwall, arrived July 30; left August 2 (370 mi.)
Hornafjord, arrived August 2; left August 5 (339 mi.)
Reykjavik, arrived August 5; left August 21 (499 mi.)
Frederiksdal, arrived August 21; left August 24 (298 mi.)
Ivigtut, arrived August 24; left August 31 (135 mi.)
Ice Tickle, Labrador, arrived August 31; left September 2 (570 mi.)
Hawke Bay, Newfoundland, arrived September 2; left September 3 (376 mi.)
Pictou, Nova Scotia, arrived September 3; left September 6 (520 mi.)
Boston, U. S. A., arrived September 6.
Mitchel Field, N. Y., arrived September 8; left September 9 (175 mi.)
Washington, D. C., arrived September 9 (220 mi.)

Women, Politics and Radio

(*Continued from page* 37)

conventions—if only something new to ridicule and about which to invent new slang! We have accomplished the important thing of putting our youngsters into the atmosphere of national affairs by means of their senses—a la Montessori, you might say—rather than depending on the dubious possibility of their reading politcal news and articles. Youngsters are fed such an unholy amount of printed matter in schools, that it is not surprising if they fail to read the newspapers and the heavy magazines on political subjects. But something that is spoken and comes into the home at the twist of the wrist via the magic ether wave is in another class entirely. Even an eight year old can get something out of it.

The intelligent woman is, therefore, doing some thinking with regard to politics and radio. She is stimulated and expectant, and the presidential campaign this fall will determine what the new invention will mean to her. She has heard of many public figures, and has a natural curiosity to hear them speak. She has, of course, but a rudimentary understanding of some of the issues involved, but it may be that among the political speakers there will arise one who has an especial genius for making women—and especially housewives—more clearly understand politics. The party which has such a man will certainly be fortunate. From the woman's point of view, most of the political orations she has heard thus far are too ponderous and abstract. She does not thrill at long words as men evidently do; nor does she have the time to spare from her dinner on the stove to follow long perorations and platitudinous dissertations on the wisdom of our forefathers. She demands practical action.

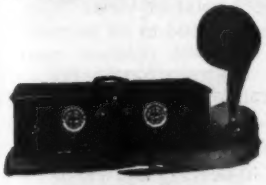
With regard to women speakers, here is a field which has a good deal

CONTINENTAL

"New York's Leading Radio House"

THE SYMBOL OF SERVICE

Sales depend upon your stock



Super Heterodyne

The vacation season is about over, customers are again back in the radio stores ready to buy good radio. Get your stock in early and sell radio receivers when the selling is at its best.

The Crosley Trirdyn 3R3 and the Radio Corporation "Super Heterodyne" receivers will lead in the fall sales. These two sets have become very popular because of their exceptional receiving qualities.

Trirdyn 3-R-3

We can supply dealers with these standard receivers almost immediately. Let us help you meet the demand for Crosley and Radio Corporation products. Order your stock early.

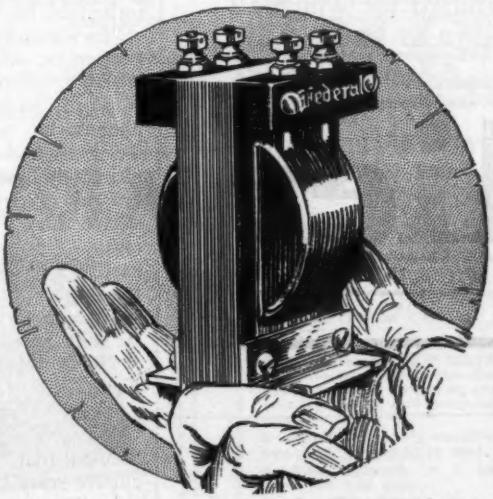
Wholesale Distributors Only

2033-Q

CONTINENTAL RADIO & ELECTRIC CORPN.

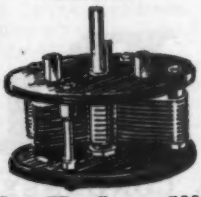
15 Warren Street — New York, U. S. A.

No. 65 Audio Transformer



No. 95 Variocoupler

Variable Condenser



Head Telephones

"Guaranteed by Federal"

The famous Federal No. 65 Audio Frequency Transformer and over 130 other standard radio parts now bear the Federal ironclad performance guarantee.

If you want exceptional tone beauty, selectivity and distance range in your home assembly, insist that each part bear the Federal Guarantee.

FEDERAL TELEPHONE & TELEGRAPH CO.
BUFFALO, N. Y.

Boston Chicago New York San Francisco Philadelphia Bridgeburg, Canada Pittsburgh

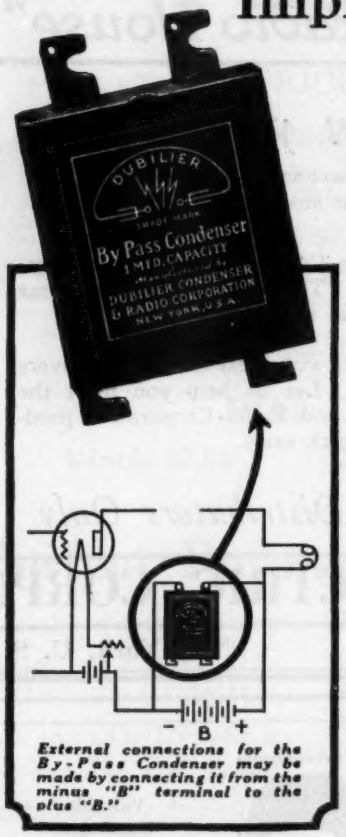
Look for this sign

Federal Standard RADIO Products

A Book "The Radio Work Bench" aids you in avoiding construction pitfalls. Sold by Federal dealers—25c—Canada—35c.

Federal Standard RADIO Products

The By-Pass Condenser Improves Reception



External connections for the By-Pass Condenser may be made by connecting it from the minus "B" terminal to the plus "B."

YOU will get the program clearer if you install a Dubilier large capacity By-Pass Condenser in your radio set. Just locate it as the diagram indicates. The result is that the minute fluctuations of the "B" battery are smoothed out into a steady, even flow of current, devoid of all noises.

The result is astonishing! Signal strength is increased—tones purer—volume smoother. The whole program comes in far truer and pleasanter than ever before.

This By-Pass Condenser in quality of material and workmanship measures up to that high standard for which all Dubilier radio devices are famous.

Dubilier

CONDENSER AND RADIO CORPORATION

ZENITH Super-Portable

A six-tube radio set, completely self-contained. Does not need to be opened to operate. Write today for full particulars and name of nearest dealer.

ZENITH RADIO CORPORATION
McCormick Building, Chicago

20 FT MAST

$10. PREPAID

Install this steel aerial mast for greater range and better results. Neat, substantial construction. 20 Ft. Mast, $10. 40 Ft. Mast, $25. 60 Ft. Mast, $45. Freight prepaid if remittance is sent with order—otherwise C. O. D. Write for circular.

S.W. HULL & CO., 2048 East 79th Street, CLEVELAND, O.

of possibility. Women have already shown that they respect and value the counsel of some able members of their own sex, and they hear them only too seldom. While in the abstract it is true that women depend, perhaps, more on man's judgment in political matters; at the same time, they are enabled to determine their own attitude more effectively if they hear able women who are in close touch with political issues describe them from an enlightened woman's point of view.

I recommend to all women that they listen to some political speeches this Fall. I also strongly recommend to political campaign managers that they make some careful experiments with political orators, including women, in order to develop and perfect the art of political speaking in a manner acceptable to a great body of voting women in the United States.

The Vansittart Case

(Continued from page 49)

ing on the same general principle of a submarine sounder, it locates strata of different densities. This apparatus, when perfected, will detect oil at any depth. The world's foremost scientists are quite willing to place at my disposal the great resources of their laboratories for this purpose. I have only to question their discoveries and inventions. They immediately retaliate with elaborate proofs, which further serves my purpose by supplying additional information of value.

"Incidentally, eminent explorers, astronomers, and even radio fans, have kindly proffered their Widow's Mite. A world wide check-up on magnetic phenomena promises fair to locate lodestone and iron deposits which may ultimately lead to the discovery of rich ore and precious metal deposits. And where there's ore, there's oil, not far away. I'm ready to surmise that the earth's magnetic poles are, in reality, the highly concentrated, mother deposits of iron ore. If so, a billion dollar lode awaits my . . ."

"King Midas' touch," interposed Keith.

"Yes," Vansittart acknowledged. "You have a fertile imagination.

"And that," he concluded, "is an exclusive story. But it will never go into print!"

"And why, pray?" asked Keith.

"Because I have just purchased the New York *Dispatch*," Vansittart replied. "The editors have very likely been notified this afternoon."

Heywood Keith was staggered.

"I'll sell the story to another paper!" he shouted.

"No, you won't!" Vansittart retorted.

"On what do you base your conclusion?" Keith mildly inquired. He

HOLLOW
Radio Aerial
IS NOT A STRANDED WIRE

The Solid Core which means added weight and resistance has been *eliminated!*
The Exposed surface which means Stronger Signals has been *increased!*

You wouldn't expect good results from a weak Battery—then why expect results from a weak Aerial? *Write for Circular.*

At Your Dealers or Sent Direct

The
AMERICAN DISPLAY CO.
Dayton, O., U. S. A.

75 FEET — PRICE $5.00

LATEST WHOLESALE RADIO CATALOG FREE

Simply send name TODAY for big 48-page catalog of latest radio goods at Wholesale. *Live dealers and agents wanted.*

STANDARD RADIO CO., 110 East 12th, Kansas City, Mo.

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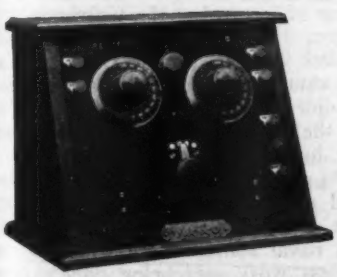

Coast to Coast Radio

Received the Chicago Evening American regional prize of $350.00, 3,000 miles range.

Price $22.50

Regenerative. Licensed under Armstrong, U. S. Pat. No. 1,113,149

OUR AMAZING OFFER

for a short time only, send us your old crystal set and we will send you one of our beautiful tube sets for the small sum of $12.50; add P. P. on 10 pounds. Circular, 2c stamp.

Tubes, batteries, phones, etc. extra.

TRESCO SALES Inc., Davenport, Iowa
P. O. Box 148

Just what you need

Valley Battery Charger

Here is just what you need to increase the pleasure and entertainment of your radio. With it as part of your equipment, you need never miss a program because of a dead battery, you can recharge a battery between signing-off time tonight and listening-in time tomorrow night.

The Valley Battery Charger will completely recharge 2-volt peanut tube cells, 6-volt A batteries and from 1 to 4 B 24-volt batteries. It is the only charger necessary for all radio batteries.

It plugs into the ordinary light socket like a fan or other household necessity, and is just as easy to operate. Takes only about a dime's worth of current to bring your battery up to full charge.

It has grained and engraved Bakelite panel which harmonizes with any radio set. Clear glass top shows the simple, patented working parts at all times.

At radio dealers everywhere.

VALLEY ELECTRIC CO.
3157 S. Kingshighway St. Louis, Mo.

LEGO WONDER

Lego Wonder Fired Detector

for

REFLEX & CRYSTAL SETS

Something entirely new.

100% SENSITIVE

10 IMPORTANT FEATURES READ THEM CAREFULLY

1—No parts to replace or wear out.

2—The use of a NEW MATERIAL that effectively eliminates distorted and interrupted reception, and substitutes clarity and increased volume.

3—Absolutely 100% sensitive. No searching for sensitive spot.

4—Glass encased, it is immune from sun and dust.

5—Especially designed to withstand high voltage or reflex circuits.

6—Solidly constructed throughout, it is practically everlasting.

7—It is ALWAYS READY—no adjustments of ANY kind needed.

8—As good looking as it is efficient. High nickel-plated throughout, and attractively designed. It enhances the appearance of any set.

9—Constructed so that it is thoroughly VIBRATION-PROOF.

10—Carefully tested, approved and unconditionally guaranteed by its makers.

For Sale by All Dealers 90c., or Sent Postpaid Insured, $1.00

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FROM BUCK PRIVATE to $3500 in RADIO

"When I enrolled with you I was a 'buck private' in the army. No sooner had I received my discharge than I opened a Radio Shop of my own in my home town. I made over $3,500 in one year working for myself. Now, that I have the National Radio Institute course beneath my hat, I wouldn't have missed it for a million dollars."
(Signed)
JOHN P. ZINNO,
Corona, L. I.

ZINNO'S case is only one of hundreds. Every day letters pour into the offices of the National Radio Institute telling about the big money they are making as a result of this easy method of becoming a radio expert at home in spare time.—"I earn $83 a week and commission"—"I cleaned up $405 in one month"—"Earned almost $4,000." These are only a few experiences of graduates of this famous radio school.

Take advantage of these wonderful opportunities to step into a big paying position in this great new field. Radio offers you an opportunity to travel and see the world, with all expenses paid, and a fine salary besides. Or you can stay at home and work up to a position paying up to $10,000 a year. One of our recent graduates secured a position one week after graduating paying a salary of $300 per month.

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Radio is the "wonder-field" of today. Thousands of trained men are needed in this field. Salaries of $3000 to $10,000 are common. Employers are constantly writing to the National Radio Institute for Radio Salesmen, Radio Engineers, Radio Operators, etc. They offer $50 to $300 a week for National Radio Institute graduates. There is a golden opportunity in Radio for you. Don't let it slip away.

No matter how little you know about electricity or Radio, no matter what your age or education is, the National Radio Institute—the oldest and biggest Radio school in America—will guarantee to make a radio expert of you in a few months right in your own home. The lessons are as easy as A B C. Almost before you know it, you will be qualified for one of these big-pay positions.

Send for FREE BOOK

Simply fill in and mail the coupon for this 32-page book, "Rich Rewards in Radio," which will show you exactly how radio will double and treble your pay. You will read the details about the only absolutely complete course now being offered which prepares you for the Government First Class Commercial License and for the bigger paying jobs in Radio. You will see actual letters telling how hundreds have mastered Radio in a few months and now earn more money than they ever dreamed of. You will get the particulars of our Special Short-time Reduced Rate being offered only to those who act immediately. Make this your lucky day. Mail the coupon now. And say good-bye to hard times.

NATIONAL RADIO INSTITUTE, Dept. 40KA.
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Send me the book, "Rich Rewards in Radio," which tells all about the opportunities in Radio, how spare time study at home will qualify me quickly as a Certified Radiotrician so I can get one of these splendid positions, and how your free Employment Service helps me to secure a good position.

Name..... Age.....

Address .....

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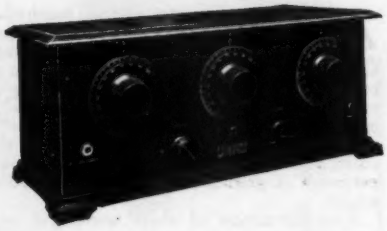
The Greatest Value Ever Offered in a Radio Receiving Set

Here it is at $60.



CLARITY
BEAUTY
VOLUME
DISTANCE
ECONOMY
SELECTIVITY

A Five Tube Radio Frequency Set

Built of the finest low loss material and in a beautiful, genuine solid mahogany cabinet. A receiver that will bring even the most distant stations to your home with suprising clarity and volume. So selective that you can pick up any station you want, night after night, at the same dial settings, and, what's more, it's the easiest set in the world to operate.

If you want to Build your Own, we have made Set Building Easy

FRESHMAN MASTERPIECE Tuned Radio Frequency Kit

No Neutralizing or Balancing Condensers Required

With these marvelous units you can easily build a five tube Radio Frequency Receiver that will be highly selective as well as a remarkable distance getter, bringing in all stations with pleasing clarity and volume.

Kit consists of 3 Masterpiece Tuned Radio Frequency Units carefully matched and balanced. Complete with wiring diagram and instructions for building any 5 tube tuned radio frequency receiver and also drilling template for proper mounting **$17.50**

Our new catalog is now ready. Write for it. It's free.

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If you have the January, February, March, April, August, October, 1923, copies of THE WIRELESS AGE send them to us and we will extend your subscription one month for each issue.

DEPT. "M"

THE WIRELESS AGE
326 BROADWAY NEW YORK CITY

"Quality Goods for Quality Readers"

had regained his composure and was inclined to be caustic.

"Why, simply this," Vansittart replied, "I have contemplated the addition of a radio section in the New York *Dispatch* and feel quite confident that you will accept the position of Radio Editor."

Keith hesitated, so Vansittart continued, "You are surely aware that you would have some difficulty in selling your story without documentary evidence to substantiate your claims. Moreover, you will have gained very little prestige, and scant assurance of a future career. Moral quibbling will gain you nothing."

"My conscience troubles me not the least," Keith affirmed.

"Then, why do you hesitate?" Vansittart asked.

"I'm wondering," replied Keith, "whether I should ask you for a salary of five or ten thousand!"

Story of John V. L. Hogan

(*Continued from page* 45)

request was sent a mimeographed copy of the talks, and about fifteen thousand letters were received during the course of the series.

"One thing we did—showed very clearly the interest that was taken. I asked for a vote on the kind of interference, besides static, that gave the most trouble. Some five thousand answers were received to this question, with the result that we discovered that sparks were the worst offenders, whistles and squeals next and cross-talking third."

"I suppose," I said, "that even when you were a boy you were interested in this sort of thing."

"Why, I made motors and set up telephone lines and that sort of thing, but I got my real start when I was only twelve years old. I attended a course of lectures at the University of Indiana where some demonstrations of wireless were given. They shot off a little cannon by means of radio waves, and did some signaling. Of course, it was the crudest kind of work at that time, but it fascinated me.

"As a result, even before I had finished school, I began to work at it. First I went to Porto Rico in 1904, to a naval station there where some wireless work was being done. Not much was known about it, but the men taught me all they did know. Then I had the good fortune to become Lee De Forest's only laboratory assistant, a position which I held from 1906 to 1907. Here we worked on grid-audion tubes—that is the tube that all modern vacuum tubes are fashioned after. We worked on radio telephony, too, and our signals were picked up by ships and naval stations.

"But the most interesting early work

RADIO

"See! Dad, how much stronger it's coming in since you bought me

BURGESS RADIO BATTERIES

SOMETIMES it's Dad who does the buying for his radio family, but you may be sure that that youngster of his sits in on the advisory board.

In all events, whether it be the boy or his father who buys receiving set equipment, the service of Burgess Radio Batteries provides a most satisfactory and economical means to greater enjoyment of the evening's radio entertainment.

"ASK ANY RADIO ENGINEER"

BURGESS BATTERY COMPANY

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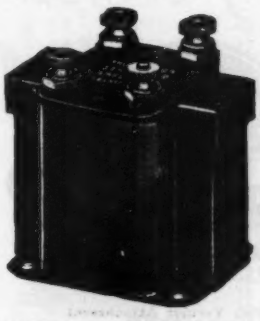
Why do these manufacturers specify Thordarson Transformers?



SUPER TRANSFORMERS
(audio frequency)

2:1 ratio	$5.00
3½:1 ratio	$4.00
6:1 ratio	$4.50

Andrews Radio Co.
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Michigan Radio Corp.
Music Radio Co.
Howard Radio Co.
Odell Ferry Corp.
Ozarka Radio Mfg. Co.
Pathé Phonograph Co.
Peerless Radio Co.
Pfanstiehl Radio Service Co.
Phoenix Radio Co.
H. G. Saal Co.
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Workrite Mfg. Co.
Zenith Radio Corp.

No purchaser of amplifying transformers is more exacting in his demands than the manufacturer of radio receiving sets. He knows that the transformer is the very heart of his finished product—that upon it rests the success or failure of his set as a musical instrument—and therefore spares no effort in conducting the most thorough and severe test possible in his search for the best.

The manufacturers listed above have all accepted the Thordarson Super Transformer as standard equipment in their sets and realize with an ever increasing appreciation just what "Thordarson" stands for in musical reproduction.

Dealers and jobbers everywhere sell Thordarson transformers with a clear conscience. They know that every Thordarson sale helps build their reputation. Visit your nearest Thordarson dealer now.

Thordarson 2:1 ratio for perfect music

Produces unusual richness of tone quality with extremely small sacrifice of volume.

Especially adapted for use in sets having a large detector output such as tuned or untuned radio frequency and reflex sets.

Functions exceptionally well with dry battery tubes as it prevents distortion caused by overloading tubes.

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Learn the Code at Home with the Omnigraph

"Just Listen—The Omnigraph will do the teaching"

THE OMNIGRAPH Automatic Transmitter will teach you both the Wireless and Morse Codes—right in your own home—quickly, easily and inexpensively. Connected with Buzzer, Buzzer and Phone or Sounder, it will send you unlimited messages, at any speed from 5 to 50 words a minute. THE OMNIGRAPH is not an experiment. For more than 18 years it has been sold all over the world with a money back guarantee. THE OMNIGRAPH is used by several Depts. of the U. S. Govt.—in fact the Dept. of Commerce uses THE OMNIGRAPH to test all applicants applying for a Radio license. THE OMNIGRAPH has been successfully adopted by the leading Universities, Colleges and Radio Schools.

Send for FREE Catalog describing three models.

DO IT TODAY.

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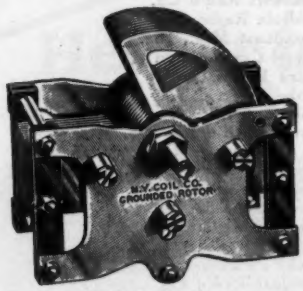
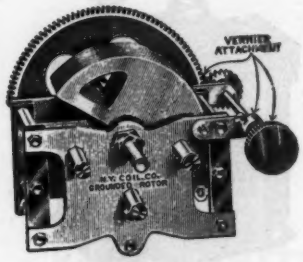
If you own a Radio Phone set and don't know the Code—you are missing most of the fun

Why be Satisfied with a Jumble of Interfering Stations?

Install a New York Low Loss Grounded Rotor Variable Condenser in Your Present Set and receive the Full Pleasure of Broadcasting



Without Vernier



With Vernier Attachment

OUR NEW LOW LOSS CONDENSER is in a class by itself—superlatively better—no other condenser manufactured incorporates so many vital improvements.

Adjustable cone type bearings, pig tail connections and stop, straight line capacity, geared vernier action (which may be purchased separately if desired)—only geared vernier that swings a 4-inch dial. Dielectric of genuine hard rubber with wide spacing of plates. In a word a precision instrument possessing the absolute minimum losses, the maximum obtainable efficiency, insuring greatest distance, sharpest possible tuning and wonderfully clear reception.

.0005 (23 plate) without Vernier **$4.50**

Geared Vernier attachment, complete, $1.50

Unequalled for Super-Heterodyne, Neutrodyne and all exacting circuits.

OUR SUPER-HETERODYNE KIT at $20.00, consisting of oscillator coupler, input, and three matched intermediate air-core transformers, makes up the best set known to date.

Other items of proven superiority: Distortionless Audio Transformers, Tuned Radio Frequency Transformers.

BY PASS CONDENSERS

.05	$ .90
.01	1.25

PRECISION MICA FIXED CONDENSERS

"More Uniform Capacity"

Type B

Type A—No Clips

Adapted by Leading Heterodyne Manufacturers on account of truthful capacity rating

This is the only laboratory precision-built condenser on the market, yet sold at a commercial price. It is standard equipment with some of the largest and most discriminating set manufacturers.

Guaranteed for capacity and against leakage or breakdown.

The following sizes always in stock:

Capacity		Retail Price
.0001	Mfd.	.35
.00015	Mfd.	.35
.00025	Mfd.	.35
.0005	Mfd.	.35
.001	Mfd.	.40
.002	Mfd.	.40
.005	Mfd.	.60
.006	Mfd.	.75

.00025, with Grid Leak Mounting attached, 45c list. Type C

NEW YORK COIL COMPANY

338 Pearl Street, New York City, N. Y.

Pacific Coast—MARSHANK SALES CO., 1240 S. Main St., Los Angeles, Calif.

The $17.50 Style

Write for details of

NATANN CHARGER

NATANN CO.

30 Front Street. Brooklyn, N. Y.

EMPIRE

EMPIRE Oiled Tubing

Real Radio Sets of today—the kind that last long and work best—are insulated with genuine Empire Oiled Tubing.

MICA INSULATOR CO.

68 Church St. New York — 542 So. Dearborn St. Chicago

Works: Schenectady, N. Y. 2030-P

"Quality Goods for Quality Readers"

was at Brant Rock, Massachusetts, in 1910. Here was the first high power station that the navy ever had. First there were two huge towers, one at Brant Rock and one in Scotland, for the testing of trans-oceanic communication, but the tower in Scotland blew down. Then we used ours to test the great spark transmitter, 100 kilowatts strong, which had been specially designed for the navy. The U. S. S. *Birmingham* sailed to Liberia, and the U. S. S. *Salem* sailed South, and every day we sent out signals to them so that we might establish a law of diminishing strength of signals, dependent on distance. This same station was later in commission at Arlington and it was this well-known old spark note which gave you your time signals. I ran the original test down there."

Mr. Hogan stayed at Brant Rock, where he worked with R. A. Fessenden, the radio telephony expert, from 1909 until 1911. He started as a telegraph engineer, and he ended as manager of the company. Besides this work, however, Mr. Hogan has been chief of operating inspection and erection with the International Radio Telegraph Company, its chief research engineer and its commercial manager, which work took him up to the year 1921. Since then he has been an independent consulting engineer, specializing in radio, acoustics and patents.

His list of titles goes on to include "Fellow and Past President of the Institute of Radio Engineers, Member of the American Institute of Electrical Engineers, of the American Association for the Advancement of Science and the Radio Club of America." He also collaborated with other famous scientists on a book entitled, "Radio Phone Receiving."

All of this is so impressive that one might expect to find a very austere gentleman instead of this rather jolly brown-haired man, with light tortoise shell glasses and kindly eyes. One might not expect, either, to find him with anything but the ultra-scientific view of his subject, knowing that he has worked out several developments on the super-heterodyne, as well as many other important contributions. Now he is at work on increasing the selectivity in receivers without increasing the dialing. He has a plan for a one-dial set which, he says, will give the sharpness of tuning of multiple circuits with the ease of tuning of one circuit—that is, it will cut out interference without making the receiver complicated.

Despite all this he is keenly alive to the romance of radio, and he says in his writings:

"The tremendous fascination of stretching out one's personal contacts far enough to intercept wireless mes-

Tune in with ease

NA-ALD

Super DeLuxe Dials

Where eye and hand are in scientific balance

Test these dials with any other and see how much more quickly you can turn to any degree or fraction of a degree.

Shorter intermediate lines, numerals on the bevel and a generous knob are the reasons.

These are truly beautiful creations which give that final touch of dignity and attractiveness to the quality set. On the set you buy look for the minute Na-ald trademark as you would for "Sterling" on silver.

75c. Other prices of Na-ald Dials are: 3½" 50c, 3" 35c and 2" (rheostat) 35c.

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NA-ALD

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Parts with a Purpose

Member of R. M. A.

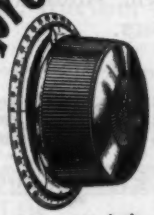
New!

Walbert Filament Lock Switch 50c

New!

Walbert Safety Rim Socket..... 75c

Improved!



Univernier with black knob and silver dial $1.25

Above parts at your dealer or sent postpaid on receipt of purchase price. (Please mention dealer's name.)

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WALBERT FILAMENT LOCK SWITCH

Safeguards Tubes and Batteries

YOU don't need to worry any more about someone meddling with your radio set while you are away. Simply remove the key from the WALBERT FILAMENT LOCK SWITCH and take it with you just as you'd take the ignition key from an auto. Your tubes and batteries will be fully protected.

Put this safeguard on your set today. Attach it in a few minutes. It's very compact—takes little room on panel or behind it. Sturdy interior phosphor bronze springs assure positive contact. Costs no more than an ordinary battery switch.

WALBERT SAFETY RIM SOCKET

The Low-Loss Lifetime Socket

THE new Walbert Safety Rim Socket is GUARANTEED not to break at the slot. Special heavy bakelite design decreases inter-element capacity thereby utilizing all available grid voltage for producing signals. (New tubes have bakelite bases for same reason.) Soldering lug and double-spring contact integral. The last word in sockets—AND LOOKS THE PART!

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Micro-Selective Tuning Control

STATIONS unheard before are tuned-in readily with the UNIVERNIER, the ORIGINAL geared tuning dial. Gives 12-to-1 (micro-selective) control of any instrument. (A lower ratio is inefficient; a higher cumbersome and needless.) New "dished" dial and heavier mechanism. Positive continuous vernier—no slippage! Pointer rigid with shaft.

Send 2-cent stamp for free copy of Univernier Log Book.

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THE NEW REVISED EDITION OF

THERMIONIC TUBES IN RADIO TELEGRAPHY AND TELEPHONY

Price $6.00
Postpaid

By JOHN SCOTT-TAGGART

Revised to MAY, 1924

A most complete text on the entire subject of the vacuum tube. Pronounced "A college education in vacuum tubes" by many prominent engineers in the field.

WIRELESS PRESS, Inc.

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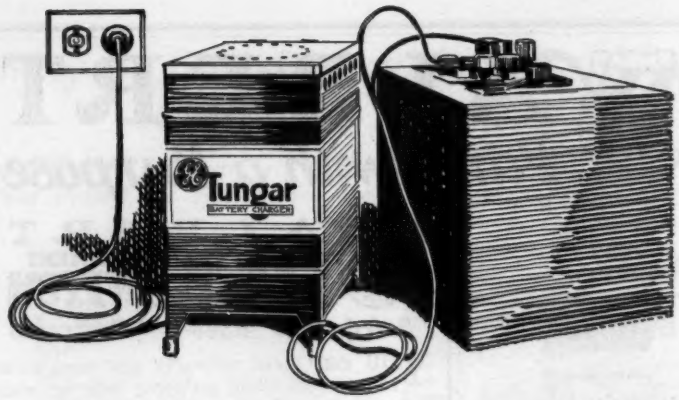


Partners for Power

For clearness, distance and pleasure from your radio—your storage battery needs its partner—the Tungar Battery Charger.

Tungar keeps the battery at top notch—always ready for you to get every program.

Attach Tungar to the house circuit for overnight charging of radio and auto batteries and be free from care.

Sold by Electrical, Auto-accessory and Radio dealers.

Tungar is one of the many scientific achievements contributed by the G-E Research Laboratories toward the wonderful development of electricity in America.

Tungar Battery Charger operates on Alternating Current. Prices, east of the Rockies (60 cycle Outfits)—2 ampere complete, $18.00; 5 ampere complete, $28.00. Special attachment for charging 12 or 24 cell "B" Storage Battery $3.00. Special attachment for charging 2 or 4 volt "A" Storage Battery $1.25. Both attachments fit either Tungar.

Tungar
REG. U.S. PAT. OFF.
BATTERY CHARGER

Tungar—a registered trade mark—is found only on the genuine. Look for it on the name plate.

Merchandise Department
General Electric Company
Bridgeport, Connecticut

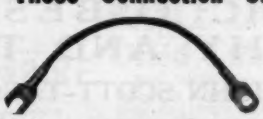
GENERAL ELECTRIC

48E-11

The Standard of the World

The base-type
Freshman Variable Grid Leak
is the standard for those who build their own sets. It is the most compact and being entirely sealed it always remains unaffected by any climatic conditions.
Complete with either .00025 or .0005 Freshman Condenser—without condenser..... .75 **$1.00**
At your dealer's, otherwise send purchase price and you will be supplied postpaid
Chas. Freshman Company, Inc.
106-7th Ave., New York

Use These Connection Strips



10 inches long, to ensure perfect contacts on your radio sets and batteries.
Sent postpaid for 75c a doz.
When ordering specify whether open or closed terminals desired.
Dealers and jobbers write for samples and prices
RADIO MFGS. SALES CO., 296 Broadway, N.Y.

"Quality Goods for Quality Readers"

sages arriving over continents and high seas, from points hundreds or even thousands of miles distant, has attracted millions of people all about the world to the study of radio. Fortunately, underlying the more transient attraction of hearing radio concerts is the valuable and permanent essence of a vital public service. The modern wireless is not merely an amusement or a toy, though on occasion it may be either or both of these.

"Radio is daily performing its man-size tasks, including trans-oceanic communication, the guidance of ships along fog-bound coasts, the tracing of criminals who, without the wireless, could have made good an escape by sea—the transmission of time signals and meteorological data of immeasurable importance to mariners and the pilots of aircraft, and the distribution of entertaining and instructive material to thousands who are home-bound or otherwise isolated."

It is unusual, too, to find a scientist interested sincerely in the amateurs of his profession. Yet that is true also of this expert, for another time he says:

"The radio faddist who gains an understanding of how the apparatus operates becomes a devotee of the art. The radio reader who finally arrives at a knowledge of the physical principles involved in the instruments becomes an adept, even though he may have to wade through reams of 'popularized' and pseudo-scientific writings. The listener who realizes just what happens inside his radio receiver becomes a true lover of this newly applied science, a veritable amateur, striving for improvement and development."

At the last I found myself asking Mr. Hogan the questions he himself propounds in his book:

"What is radio coming to? In another ten or fifty years shall we be able to receive in our houses not merely operatic music but also a visualized imagine of the performance itself? Will it be possible for us to press a combination of buttons on a small control box and instantly be put into telephonic communication with some one else, no matter where? Can we hope to drive flying machines at undreamed-of speeds by generating on earth the requisite power and then transmitting it by radio to the plane? If there are intelligent beings on other planets of our solar system, shall we one day speak to them?"

What "Arabian Nights" questions! But when I put them to him, Mr. Hogan only leaned back in his chair, looked out over City Hall Park, and puffing contentedly on his pipe, answered:

"That's what we are all so anxious to know."

The Real Thrill of Radio

Programs from Distant Stations

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Per Land Line

(*Continued from page 31*)

fians dropped in to see me, headed by Greasy Gregory, the well-known though unprovable gun-runner.

"Well," says this individual, shifting a plug of tobacco from one cheek to the other and looking at me with distaste, "you been at it again, ain't you?"

"At what?" I asked.

"You been after the votes of the rich, by beatin' up an alleged criminal—two alleged criminals," says Greasy, transporting the quid some more, "without reflectin' that us—poor men—said we wouldn't have no peace-officer beatin' us-all up. We don't mind bein' arrested, if we done somethin', an' you can catch us. But we ain't goin' to stand for bein' beaten up."

Now, of course, I could have started an argument by saying, "Not even if you start in to try to kill me?" but that wouldn't have done any good.

Instead, I looked at Greasy in surprise, and said, "Criminals?" And when he said "Yes," I put on a look of blank amazement, and demanded what criminals I'd been beating up.

"This Guy Bronson," said Greasy, juggling the plug some more. "That's who."

"Why, you're all wrong," says I. "Bronson isn't a criminal!"

Greasy paused with his plug halfway across, and stared at me. You see, he couldn't say "Yes, he is," without more or less indicating himself as an aider and a better, which he naturally wouldn't care to do.

"No?" he asks, kind of dazed.

"Why, no," says I. "What gave you such an idea? He's a salesman of infra-super-neutrostats. Of course, I did have a bit of an argument with him last night—he was so unreasonable—but——"

"What's old man Stevens had Bill Garfield put him under arrest for, then?" demanded Greasy.

"Don't you think you'd better ask old man Stevens that—or Bill Garfield?" I inquired, as it was.

Greasy kind of waggled his head around like a corkscrew.

"Very neat," says he, winking one eye meaningly, "but you beat him up before he was arrested."

"He took and fired a revolver in my face, entirely free of charge," says I, being too weak to remember the word "gratuitously."

"Yeah, but why," corkscrews Greasy, "had you followed him over to the Circle S in the first place—sick as you were? Eh?"

"That's what I'm telling you. He left a radio machine to be tried out, and I tried it, and all I could pick up with it was conversations over the local telephone lines."

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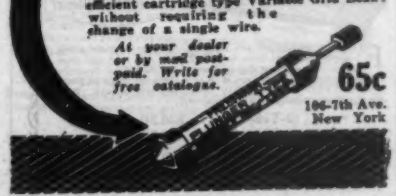

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From the expression on Greasy's face, I suddenly conceived the suspicion that he'd been using the local telephone lines on illegal business himself the night before. Of course, I hadn't heard him; equally, of course, I didn't say I hadn't. Perhaps that has something to do with the remarkable vote his followers have just piled up for me in the election.

"Well," says Greasy, "what's that got to do with him landing in the Prairie Dog hospital, with—he looked at a slip of paper—"one broken arm, two sprained ankles, three fractured ribs, twelve major contusions, one hundred and four minor contusions, six major lacerations of the epidermis, forty-six scratches, and concussion of the brain for himself and his friend?"

My reply did sound kind of weak after that; but Greasy wasn't at all himself since my remark about listening in on the phone; so I thought I would chance it, and events, as aforesaid, have proved me right.

"Why, I'll tell you," says I, looking innocently at the deputation and repeating myself for a good and sufficient reason. "This radio set was guaranteed to give me KDKA, which is Los Angeles, and President Coolidge, and prize-fights, and everything, all over the world. Whereas, as I say, it only gave me local—telephone—conversations."

Yeah—Greasy had been talking. I could tell by the look in his eyes—also by the fact that he tried to say something, and couldn't.

"Therefore," says I sweetly, "I rode over—hearing Bronson was at the Circle S—to tell him I'd decided not to take it."

There was a dead silence.

"Oh," says Greasy at last, looking at me.

"Yes," says I, looking at him. "And also—in the language of the radio—'bow-wow.'"

Chat With Vaughn De Leath

(*Continued from page 32*)

hastened the evolution of organized broadcasting. Look at it now! Hundreds of stations all over the world. And to think that I helped start it!

There are many American singers, but mine was the first voice to be heard across the Atlantic. Despite the fact that others have laid claim to this, I have the credentials to prove this statement. What's more, it was heard in seven European points simultaneously.

I suppose most of you fans remember the fun we had at WDT a year ago? What days those were! and nights! Sometimes not so much fun. For instance, when we had transmission troubles and I had to apologize for everything that went wrong. In spite of technical troubles we offered some

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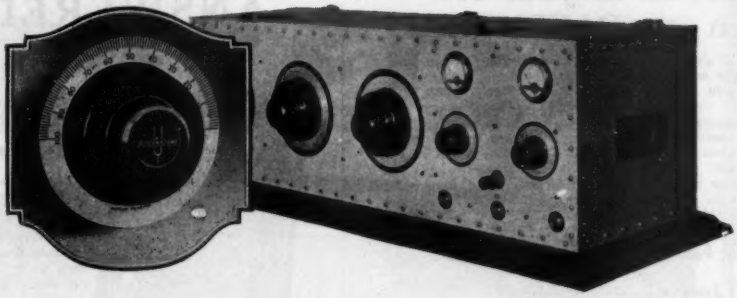

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mighty fine programs, and many of the world's best artists were at the service of the great radio audience through this station.

I was always trying to think up something new and finally conceived the idea of broadcasting my birthday party of September 26th, so that all of the fans could attend audibly if not bodily. It was a wonderful party (if I do say it, as shouldn't), with lovely gifts, numberless phone calls, banks of flowers, wires, favors, lots of people, oodles of fine talent, some good "eats," and last but by no means least, a huge cake with radio towers 'n' everything (some candles, too—'bout 16, I guess). But I had some difficulty in distributing the cake over the air, for it choked the mike! To make a long story short (for I couldn't begin to tell you *all* about it in so short a space), I'll quote from the proverbial *Village Gazette*, " * * * refreshments were served at a late hour by the hostess and a good time was had by all."

It's now past tea-time and nearing the hour when "friend husband" will be doing a "homer" so I must stop chatting with you old friends and see what kind of an "amplifier" I can concoct for the "gude mon!" If you know any good recipes, send them over. I may start a Radio Cook Book. Who can tell?

Lots of good luck, and let me hear from you soon.

Faithfully, Your Radio Girl,

VAUGHN DE LEATH.

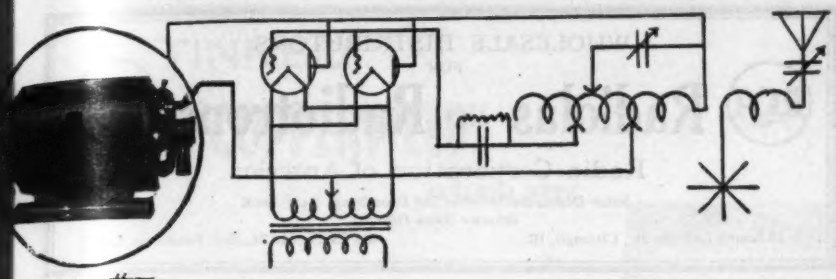
Radioviewing Industry

(*Continued from page 56*)

MR. DAVID M. KASSON will be in charge of the radio division of the Interstate Sales Company. This concern has carefully studied the radio field before entering the market. They will undoubtedly operate with the same high ideals to which the Victor dealers are accustomed.

THE MAGNAVOX COMPANY have launched a new pamphlet on its publicity course that is not only worthy of note, but wholly worthy of reading. Published in the interest of registered Magnavox dealers, it carries a real message to any individual interested in radio. A word on the radio industry; new Magnavox products; the manufacturing steps, illustrated; and finally a few live sales tips.

PHILADELPHIA and adjacent territory need no introductions as a market for radio products. The Third Annual Philadelphia Radio Show will be held at the Second Regiment Armory, October 18th to 25th. The attendance, class of exhibitors, the uniformity and attractiveness of these shows, and above all, the results obtained may justly reward the Quaker City with a feeling of pride and well being.



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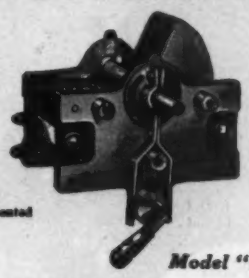

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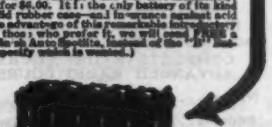

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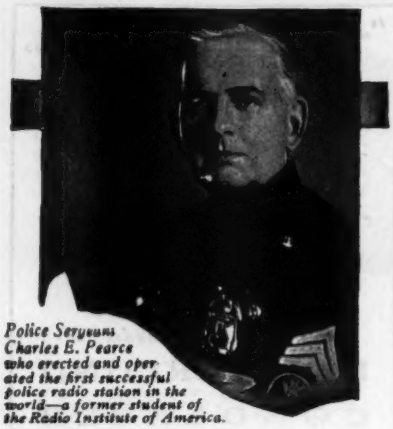

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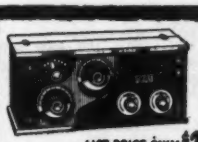

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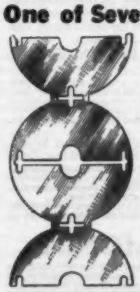

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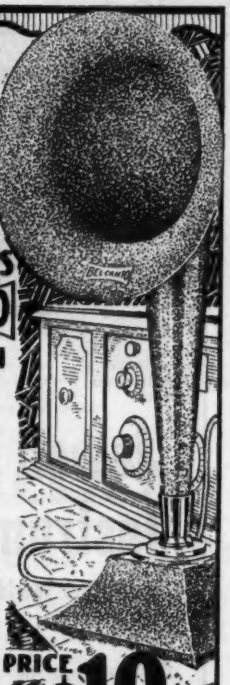

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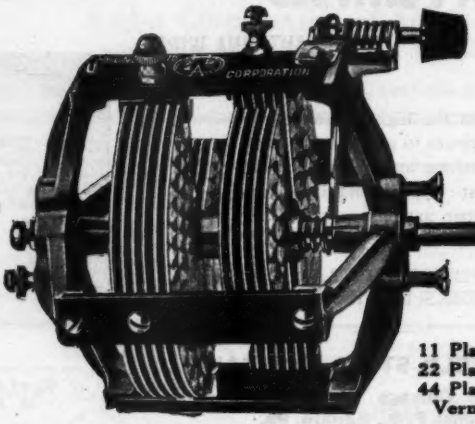

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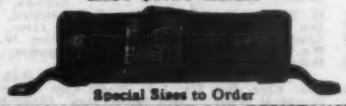

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1 ACJ Edwin W. Strom....81 Green St., Woburn, Mass.
1 ACK Paul E. Watson.....46 Everett St., Bangor, Me.
1 ACY John Cowin.....292 Prince St., W. Newton, Mass.
1 ADQ Philip L. Bruce, 44 Churchill St., Newtonville, Mass.
1 ADU Leon H. Kielar.....E. Main St., Orange, Mass.
1 AEN Edward A. Michelman, 35 Waldeck St., Boston, Mass.
1 AEV Roland F. Crockett....Commercial St., Rockport, Me.
1 AEX Foster F. Graves.....Essex, Conn.
1 AFD T. Glenwood Tuttle, Academy Hill, Westminster, Mass.
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1 LG Wesley S. Roberts, 65 Highland St., Roxbury, Mass.
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1 BZC Roy S. Little.....17 Herbert St., Lynn, Mass.
1 FS L. G. Cumming.....Prout's Neck, Me.
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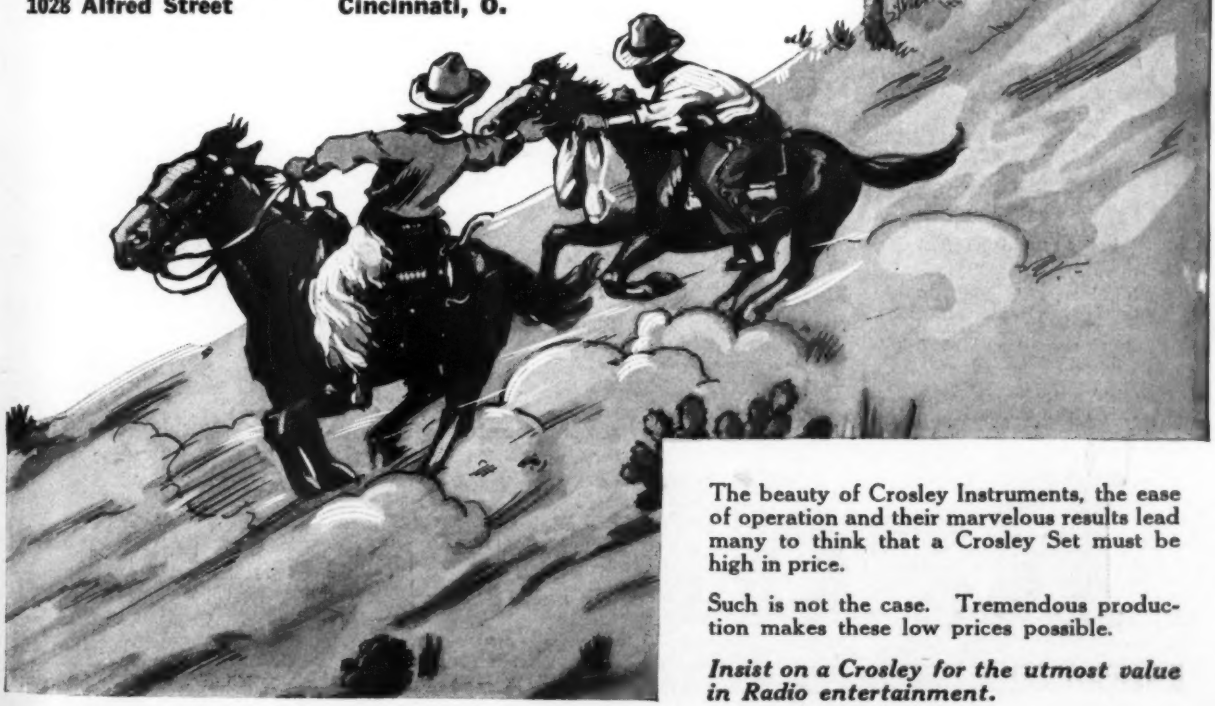

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